



# How extractive industries affect health: Political economy underpinnings and pathways

Ted Schrecker<sup>a,\*</sup>, Anne-Emanuelle Birn<sup>b</sup>, Mariajosé Aguilera<sup>c</sup>

<sup>a</sup> Institute of Health and Society, Newcastle University, United Kingdom

<sup>b</sup> Critical Development Studies and Social and Behavioural Health Sciences, Dalla Lana School of Public Health, University of Toronto, Canada

<sup>c</sup> Independent researcher, Miami, FL, USA

## ABSTRACT

A systematic and theoretically informed analysis of how extractive industries affect health outcomes and health inequities is overdue. Informed by the work of Saskia Sassen on “logics of extraction,” we adopt an expansive definition of extractive industries to include (for example) large-scale foreign acquisitions of agricultural land for export production. To ground our analysis in concrete place-based evidence, we begin with a brief review of four case examples of major extractive activities. We then analyze the political economy of extractivism, focusing on the societal structures, processes, and relationships of power that drive and enable extraction. Next, we examine how this global order shapes and interacts with politics, institutions, and policies at the state/national level contextualizing extractive activity. Having provided necessary context, we posit a set of pathways that link the global political economy and national politics and institutional practices surrounding extraction to health outcomes and their distribution. These pathways involve both direct health effects, such as toxic work and environmental exposures and assassination of activists, and indirect effects, including sustained impoverishment, water insecurity, and stress-related ailments. We conclude with some reflections on the need for future research on the health and health equity implications of the global extractive order.

## 1. Introduction and rationale

The contemporary global order, and associated human activity, depends on acquisition and transformation of vast quantities of material resources, most notably by way of what are conventionally referred to as extractive industries: mining, oil, and gas. The commercial transactions and value chains that connect and convert raw materials into finished products span the globe, exemplified by the use of cobalt mined in the Democratic Republic of Congo (DRC) in mobile phones assembled in China and Korea; the phones, like virtually all electronics, incorporate many other components sourced from multiple countries, and are in turn sold to consumers worldwide, although ownership of many products is more widespread among higher income consumers. On one estimate, 80% of world trade involves commodity or value chains controlled by transnational corporations (TNCs) (UNCTAD, 2013).

Increasingly, a range of resource-based economic activities well beyond minerals and fossil fuels are taking on a similarly extractive character, such as sand mining for roads and construction in distant locales and large-scale foreign acquisition of arable land for purposes of

exporting crops (“land grabs”)—and the water used in their production. Like conventional mining, oil, and gas extractive industries, land and sand grabs and similar activities are intrinsically and inescapably place-specific because of the fixed location of the resources being extracted or appropriated. The various activities in question are connected by homologous “logics of extraction” (Sassen, 2014)—Saskia Sassen’s conceptual rubric that draws, in turn, from David Harvey’s earlier concept of “accumulation by dispossession” (Harvey, 2003).<sup>1</sup> In keeping with Sassen’s work and the emergence of “neoextractivism” as a description of both the redistributive possibilities and the constraints on resource development in the context of left-leaning governments in Latin America (e.g. Cáceres, 2015; North and Grinspun, 2016), we adopt a broader than usual definition of extraction, covering agricultural land, water, and sand, and addressing not only the acquisition of these resources, but also the institutional and political processes that make acquisition possible. In other words, we define extraction both as physical and economic activities and as social relations characterized by “power asymmetries,” together critical elements for understanding the equity dimension of global governance for health (Gill and Benatar, 2016; Ottersen et al., 2014).

\* Correspondence to: Level 5, Sir James Spence Institute, Newcastle University, Newcastle upon Tyne NE1 4LP, United Kingdom.

E-mail address: [theodore.schrecker@newcastle.ac.uk](mailto:theodore.schrecker@newcastle.ac.uk) (T. Schrecker).

<sup>1</sup> For applications in specific country contexts see Cáceres (2015), Gordon and Webber (2008) and Holden et al. (2011).

What do these activities have to do with health? Hypothetically, revenues and royalties from a well-managed extractive sector could be used to improve health outcomes and reduce inequities via redistribution to equitably improve living conditions, including through investments in health care systems (Ridde et al., 2015). In this regard, Norway's management of its extraction-related wealth stands out: its governance approach seeks to ensure long-term, equitable social benefits from its petroleum resources (Ramírez-Cendrero and Wirth, 2016). However, Norway's approach is more an anomaly than the rule. Resource revenue flows can have the opposite effect if wealth is concentrated and financial gains are subject to corruption and illicit financial flows that avoid taxation and reduce governments' fiscal capacity, in turn exacerbating inequalities.

Moreover, the extractive sector and associated activities are frequently linked to a host of direct and indirect negative health effects. These include workplace exposures, environmental contamination, and resource depletion, with the latter two also leading to reduction or loss of livelihoods. Large-scale foreign acquisitions of land for export-oriented agriculture may result in diminished food sovereignty and water security. Dispossession and displacement associated with large-scale resource development can give rise to stress-related health effects, including those resulting from the material effects of lost livelihoods and accompanying spiritual and cultural violation of sacred natural resources, especially for Indigenous populations, who are often subject to extraction-related degradation and dispossession. Repression of resistance to such displacement and the destructive effects of extraction has increasingly involved violence against objectors, including rape and targeted killings.

Research on the health implications of extraction tends to be case-specific and focused on proximal effects rather than on social determinants of health: conditions of life and work that affect health outcomes and health (in)equities, and the underlying “inequitable distribution of power, money, and resources—the structural drivers of those conditions of daily life” (Commission on Social Determinants of Health, 2008, p. 2; see also Birn et al., 2017, chapters 7, 9; Kelly and Doohan, 2012). A few correlational studies link extractivism and health based on panel data (Cotet and Tsui, 2013; El Anshasy and Katsaiti, 2015), but these are politically disembodied, omitting or simplifying political economy framings and variables and conspicuously failing to consider effects on within-country health inequities. By contrast, a broader body of social scientific work on extractive industries foregrounds issues of political economy, and we draw on it extensively in our analysis, reflecting the insight of iconoclastic epidemiologist Nancy Krieger that “analysis of causes of disease distribution requires attention to the political and economic structures, processes and power relationships that produce societal patterns of health, disease, and well-being via shaping the conditions in which people live and work” (Krieger, 2011, p. 168, emphasis in original; see also Birn et al., 2017, p. 92–95 and chapter 7). We focus on societal (political, economic, social, cultural) as well as biological, physical, and chemical influences on health and illness, with an emphasis on macro-scale processes and power differentials. At the same time, it is essential not to regard the social and the biological as distinct realms, but rather as parts of an integrated whole in which social and biological influences interact (Rodríguez, 1994; Blane et al., 2013; Kelly et al., 2014).

To ground our analysis in concrete place-based evidence, we launch the analysis with brief case examples of four leading forms of extraction. We then analyze the political economy of extractivism, focusing on the societal structures, processes, and relationships of power that drive and enable extraction. Next, we examine how this global order shapes and interacts with politics, institutions, and policies at the state/national level contextualizing extractive activity. Having provided necessary context, we posit a set of pathways that link the global political economy and national politics and institutional practices surrounding extraction to health outcomes and their distribution. These pathways involve both direct health effects, such as toxic work and environmental

exposures and assassination of activists, and indirect effects, including sustained impoverishment, water insecurity, and stress-related ailments. We conclude with some reflections on the need for future research and on the importance of systematic attention to the health implications of the global extractive order in the context of ongoing development imperatives.

## 2. Case examples of extraction

Our illustrations of the political economy nexus and pathways linking extraction to (ill) health are drawn primarily from four geographically diverse case examples of extractive processes, two of them region-specific and two global in scope: a) mining in Latin America; b) oil and gas extraction in the Gulf of Guinea region of Africa; c) global land and water grabs; and d) the lesser-known case of sand mining.

**a) Mining** is one of the world's most lucrative industries. Most countries carry out some form of mining, with extractive TNCs active on all continents and mining a major global source of health and social injustice (Morrice and Colagiuri, 2013). As of December 2017, the world's 50 largest mining transnationals were collectively worth \$896 billion by market capitalization (Els, 2017). Even when identified resources are not exploited, the highly competitive junior exploration firms that scout locales generate lasting environmental damage, for which they are typically not held liable because they operate outside the scope of royalty agreements and environmental regulations (Dougherty, 2013).

**Latin America** is the top destination for mining-related foreign direct investment (FDI), instantiating the long, global political economy tentacles of the “undergoverned extractive” sectors (Dávila, 2009; Gordon and Webber, 2016). Since the 1990s, Latin America has experienced one of the largest mining booms in history (Heidrich, 2016), a resurgence of the region's mineral (mis)fortunes that began under Iberian colonial exploitation (Galeano, 1971). Indeed, this mining bonanza, propelled by Canada (Working Group, 2014), continues today even after declines in global mineral commodity prices and despite questionable benefits for host countries, some of which even subsidize TNC activities (Helwege, 2015). This situation offers a window into a number of political economy of health issues relevant to mining (and other extractive industries) elsewhere, as well as a clear illustration of the role of the World Bank and export credit agencies in promoting extractive industries as a development strategy, often with scant regard for the deleterious impact on the environment, health consequences, or the rights of displaced populations (Hatcher, 2014; Munariz, 2008; Szablowski, 2007).

**b) The dependence of the world economy on oil and gas** is axiomatic; these account for roughly half of world energy consumption. From oil drilling underground and offshore, through refining into liquid fuels (gasoline and diesel), and transport over long distances via pipelines, trains, tankers, and trucks, there are multiple potential health hazards: spills, leaks, collision-related fires, and the “flaring” of gas at the wellhead (Union of Concerned Scientists, 2015).

Oil production in the **Gulf of Guinea region** began with the discovery of oil in Nigeria by a partnership between British Petroleum (BP) and what is now Royal Dutch Shell in 1956. Subsequently, and especially in the first decade of the 21st century, interest in oil development in sub-Saharan Africa increased for both economic and geopolitical reasons: high oil prices and the desire of the United States, in particular, to lessen dependence on Middle Eastern oil. The major oil transnationals active in the region are Royal Dutch Shell, France's Total, US-based Chevron and ExxonMobil, and Italy's AGIP (Soares de Oliveira, 2007, p. 160), with the usual mode of operation involving partnership with a state-owned national oil company. Among other hazards, repeated oil spills over decades have made the Niger Delta one of the world's most polluted locales, destroying farming and fishing livelihoods, exacerbating poverty, and exposing millions of people to water contaminated with carcinogens (UNEP, 2011).

c) Another form of rapidly expanding extractive activity involves “**land and water grabs**,” which have a complex provenance. Rapid increases in the price of food on global markets in 2007–2008 threatened to undo much of previous decades’ modest progress in reducing undernutrition and food insecurity in low- and middle-income countries (LMICs) (Dawe and Drechsler, 2010; Masonet et al., 2011; Ortiz et al., 2011; Prain, 2010; Ruel et al., 2010). Concerns about food security<sup>2</sup> in food importing countries, focus on agricultural land as a profitable investment, and growing demand for biofuels as a substitute for fossil fuels drove a rapid acceleration in large-scale transnational acquisitions of arable land and the associated water resources (Buying farmland abroad, 2009; D’Odorico et al., 2017; Dell’Angelo et al., 2017a; Dell’Angelo et al., 2018).

According to the most reliable estimate, since 2000 approximately 49.3 million hectares of land—more than three times the agricultural land area of the United Kingdom—has been acquired by foreign investors (including those linked to or supplying a handful of large food and beverage conglomerates) and the governments of food-importing countries (Land Matrix, 2017). This phenomenon has been described as a “wide-ranging global ‘land reform’—in this case, a regressive land reform where governments take land from the poor and give (or sell or lease) it to the rich” (White et al., p. 620). Because production and export of crops involves substantial use (and thereby export) of water, the effect is a large-scale “virtual water trade” (Carr, et al., 2013; Hoekstra and Mekonnen, 2012; Tamea et al., 2013) in which agriculture plays a central role as the consumer of 70% of the world’s fresh water (World Water Assessment Programme, 2017).

d) A neglected but rapidly evolving extraction crisis involves **sand mining**. Global consumption of sand as a commodity surpasses 40 billion tons per year (UNEP, 2014). Sand is used in the production of a multitude of consumer products and is also used in hydraulic fracturing (“fracking”) to extract natural gas and oil. But the biggest consumer of sand (and more broadly of aggregates—a combination of sand, gravel, and crushed stone) is the construction industry. Sand is a key ingredient of concrete and asphalt; concrete is the most consumed resource by volume in the world, after water.

Rapid urban growth and the associated construction and real estate booms of both high- and middle-income economies (Padmalal and Maya, 2014; Pereira and Ratnayake, 2013), which are closely tied to global flows of finance (see e.g. Gaffney, 2015; Goldman, 2011; Levien, 2013; Stockhammer, 2012), are driving the soaring demand for sand. The construction industry is expected to grow by 85% by 2030, led by three countries: China, India, and the USA (Global Construction Perspectives, 2015). Not surprisingly, these countries are also among the top sand-importing countries in the world (UN Comtrade Analytics, 2016). The building frenzy of Arab Gulf States, such as Qatar and Kuwait, also make these small countries major sand importers despite their proximity to desert sand.<sup>3</sup> To meet this demand, sand is mined, often illegally, from beaches and inland sand dunes and dredged from river and ocean floors around the world—in settings as distinct as Sri Lanka, Cambodia, Italy, Ghana, and the USA (California)—at a level of intensity that far exceeds the natural replenishment rate (UNEP, 2014).

<sup>2</sup> Food (and nutritional) security refers to availability and accessibility of sufficient quantities of (nutritious) food. Because patterns of agricultural production, ownership, and distribution often exacerbate nutritional insecurity—since small agricultural producers are frequently displaced by agribusiness TNCs, and non-nutritious food may be distributed by aid donors or promoted by TNCs—food sovereignty has emerged as a grassroots-driven contestation to the notion of food security. Food sovereignty refers to autonomous decisions regarding production and consumption of food, respecting both socio-cultural norms and the preservation of smallholder production as the best antidote to food insecurity (see e.g. Patel, 2009; Fairbairn, 2010). We are grateful to Ryan Isakson for pointing us to these sources.

<sup>3</sup> The rounded shape of desert sand makes it inadequate for construction uses as the grains do not effectively bind together (Welland, 2009).

### 3. Political economy of extractive industries, I: The social, political, economic, and historical context of global extraction

Nothing is new about large-scale transnational resource extraction for economic gain. The exploitation of place-specific resources by powerful interests is a recurring theme in world history: the Spanish and Portuguese conquest of the Americas in search of gold, silver, and other precious metals; the succession of staple commodities that laid the foundation for Canada’s prosperity; and the exploitation of colonial rubber plantations in “British” Malaya and the “Belgian” Congo (Hochschild, 1998) are just three of myriad historical examples. Undergirding the extractive imperialist enterprise were military invasion and occupation, slavery and forced displacement of Indigenous populations, and labour exploitation on the part of colonial powers, all with deadly consequences for those colonized.

Complex border-crossing value chains are likewise not a recent phenomenon. During the transatlantic triangular slave trade, which was well established by the middle of the 17th century, European textiles, weapons, alcohol, and metals were shipped to West Africa and sold or bartered for over 11 million Africans, who were captured, enslaved, and transported to the Americas and the Caribbean; 12–15% died in the “middle passage.” At these destinations, this human “cargo” was sold or exchanged for agricultural goods produced by other enslaved labourers. The agricultural products were then transported to British, French, Dutch, and Portuguese ports on the same vessels that were once again laden with European commodities to repeat the profitable and deadly circulation of labour, raw materials, and manufactured goods (Walvin, 2015).

With today’s resurgence of extractive activity and at a time of increasing concern with the broader societal determinants of health, a systematic and theoretically informed analysis of how extractive industries—using our more expansive definition—affect health outcomes and health inequity is overdue (see Fig. 1). Many cultural, technological, and economic factors combine to influence the forces driving resource extraction and its health consequences, but one stands out: global capitalism. Accelerating in the postwar consumer era, market- and profit-driven growth—accompanied by militarism and magnified by neoliberal globalization since the 1980s—has generated ever-growing demand for all sorts of goods, with little regard for the health, environmental, and resource depletion consequences.

The context of global extraction also reveals the role of particular players and associated power asymmetries. TNCs, government policies, and market demand (notably including the demand associated with military technologies; see Quinn, 2015) are at the centre of intensified extraction, and some of the production and consumption patterns that make it economically and politically rewarding. Meanwhile, those suffering the consequences of extraction are disproportionately located in (territorially or socially defined) peripheries (cf. Robinson, 2002). Although workers and consumers necessarily participate in this nexus, they do not control it or the global arrangements that sustain it, and the poorest—wherever in the world they are located—benefit the least. This constitutes what might be called extractive injustice.

A key component of the power asymmetries that characterize global capitalism (and their influence on health) is the role of international financial institutions (IFIs), most notably the World Bank. The Bank has advocated for extractive sector investment on the questionable presumption that this would generate the needed revenues to fund countries’ social and economic development plans (see e.g. World Bank, 1992). In some cases, financing for land grabs has been provided by the World Bank through the International Finance Corporation (IFC), the unit that lends at market rates (Daniel and Mittal, 2010; White et al., 2012); between 2010 and 2016 alone, the World Bank Group financed \$8.7 billion in mining, oil and gas investment (World Bank, 2017). A multinational investigation (International Consortium of Investigative Journalists, 2015) found that between 2004 and 2013 World Bank-financed projects in a range of sectors (e.g., transportation, water and

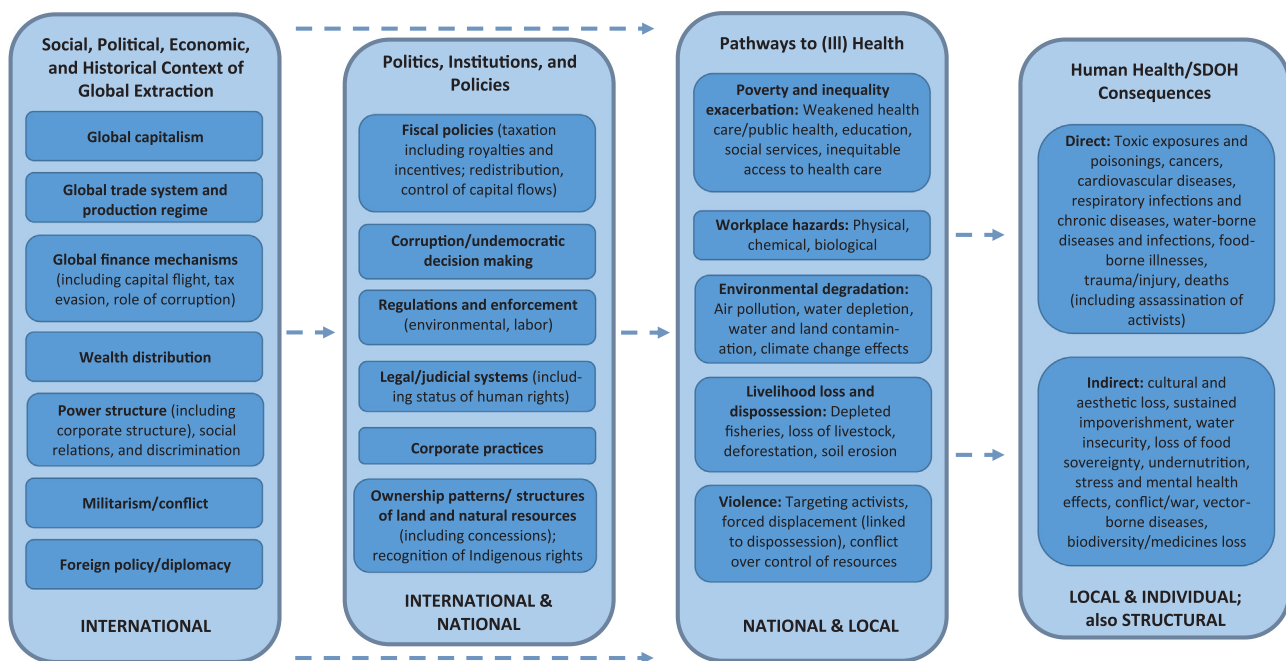


Fig. 1. Schematic of the political economy of global extraction and health (adapted from Birn et al., 2017).

sanitation, agriculture, forestry, energy and mining, health services, education, finance, and others) displaced 3.4 million people, either physically (by forcing them from their homes and/or land) or economically (by harming their livelihoods). And in his 2017 report, the United Nations Independent Expert on the promotion of a democratic and equitable international order (de Zayas, 2017) noted evidence that World Bank-supported companies have been engaged in land grabbing, forced displacements, child labour, and environmental destruction and contamination, among other unacknowledged health-destructive actions.

As important from a health perspective is an international order that creates hospitable havens for flight capital: financial centres that provide opportunities for tax avoidance, for both individuals and TNCs, and rarely make inquiries about the origin of assets (Curtis and Jones, 2017; Garcia-Bernardo et al., 2017; Harrington, 2016). These havens are of course also immensely profitable for the financial services industry, as revealed by the network of offshore transactions exposed by the Panama and Paradise papers (International Consortium of Investigative Journalists, 2017a, b). Africa is one of the world's regions with the highest percentage of private wealth held outside its borders; only Russia and the Persian Gulf states rank higher (Zucman, 2014, p. 140), and the availability of safe offshore havens is a prerequisite for routine appropriation of billions of dollars of resource revenues by political elites (see e.g. Agbese, 2015; Page, 2016 on Nigeria and García-Rodríguez et al., 2015; Onishi, 2017; Redvers, 2012 on Angola). A 2015 report found that from 2000 to 2010 “[m]ore than half (56.2 per cent) of the IFFs [illicit financial flows] from the African continent over the period come from oil, precious metals and minerals, ores, iron and steel, and copper” (High Level Panel, 2015, p. 97). This pattern of capital flight deprives economies of desperately needed resources for investing in development, including in poverty reduction measures and comprehensive and equitable health systems (Collier, 2008; Ndikumana and Boyce, 2011; Nkurunziza, 2015).

#### 4. Political economy of extractive industries, II: politics, institutions, and policies

It is important, first of all, to recognize that the current global order did not “just happen.” It is, in fact, best understood as the outcome of a

complex political project (Harvey, 2006; Marchak, 1991) in which governments and political elites have acted to promote what is now referred to as globalization (Halperin, 2013, especially chapter 8) or, more pointedly, the neoliberal phase of global capitalism (Wood, 1999). More concretely, the power structures, rules, and imperatives undergirding extraction as a prime and long-term feature of global capitalism shape and interact with national-level politics, institutions, and policies that promote and facilitate extraction (Fig. 1). These include fiscal policies around incentives for exploration; royalty rates for natural resource extraction; taxation of incomes from the extractive sector; and (inadequate) control of capital outflows, as well as less formalized dimensions of complicity, corruption, and accountability gaps. An additional layer of policies involves such factors as corporate governance practices (e.g. regarding bona fide “corporate social responsibility” and transparency); regulations and enforcement (or their absence); (lack of) recognition of Indigenous rights to land and subsoil resources; and (lack of) legal/judicial recourse, including at the international level, in the event of human rights violations by extractive industries or governments that facilitate their activities. Not all of these can be explored here.

The larger extractive order also integrates local activities that operate on the sidelines of TNCs. As commodity prices rose in the first decade of the 2000s, small-scale informal (artisanal) mining also expanded, often on the outskirts of large mines or at abandoned sites, in turn feeding into larger corporate supply chains. For example, in the DRC, which supplies more than half the world's cobalt, some 40,000 child artisanal miners scavenge for cobalt in discarded rocks from industrial mines, sometimes supporting their families where livelihoods have been disrupted. A subsidiary of China-based Huayou Cobalt is among the largest companies that purchases artisanally-mined cobalt, processing it to sell to the world's largest electronics TNCs (Amnesty International, 2016).

This is the context for the so-called “resource curse” in which resource-rich economies are claimed to underperform relative to others on growth and, especially, social indicators (for non-technical overviews see Gary and Karl, 2003, pp. 21–24; Karl, 1999; Siegle, 2009). The petro-states of sub-Saharan Africa are often held to exemplify this phenomenon. A recent review of the resource curse literature concludes “there is strong evidence that one type of resource wealth—petroleum—has at



least three important effects: It tends to make authoritarian regimes more durable; it leads to heightened corruption; and it helps trigger violent conflict in low- and middle-income countries, particularly when it is located in the territory of marginalized ethnic groups” (Ross, 2015, p. 240; see also Siegle, 2009 on the high correlation between hydrocarbon resource endowments and autocracy, and Williams and Le Billon, 2017 on the complex interactions between politics and power in natural resource contexts). Indeed, in the sub-Saharan context the enclave character of the associated extractive and industrial activity (Ferguson, 2005; Le Billon, 2005, p. 6; Shaxson, 2007, p. 1133) involves minimal benefit to the local economy, as noted in the next section of the article.

However, much of the resource curse literature treats not only resource endowments but also political institutions and allegiances as largely endogenous to the countries in question (Haarstad, 2016). An alternative view, applicable to a range of resource-based economies, foregrounds the interaction between the international political-economic and institutional environment and domestic politics. Arguably, predatory political regimes in oil-producing countries “survive not because of the conservatism of an international society unwilling to acknowledge their dereliction, but because of the networks of international complicity that underpin them” (Soares de Oliveira, 2007, p. 59). Elements of that complicity include tolerating and even supporting the repressive policies of national governments, such as the stifling of opposition to the Chad-Cameroon oil pipeline by both governments (Horta, 2012). The lack of international action following the Nigerian military dictatorship's 1995 execution of anti-Shell Ogoni activist Ken Saro-Wiwa and eight other Indigenous Ogoni campaigners (Henshaw, 2015) and later harassment by the civilian government of litigants opposed to gas flaring are further examples of this complicity.

More generally, the opportunity for huge financial gains also creates opportunities for corruption, especially in the form of patronage networks and rent-seeking, that are central to the operation of the resource curse and affect health through various, mainly indirect, pathways (Kolstad and Søreide, 2009; Le Billon, 2011). On one hand, Siegle (2009) argues that international institutions can incentivize domestic accountability and disincentivize autocratic rule (a point revisited in the concluding section of the article). Yet as Le Billon (2011; see also Kolstad and Søreide, 2009) shows, there are multiple entry points for illicit financial flows (corruption, illegal exploitation, and tax evasion) in the extractive sector. In the case of mining, as argued by the Observatory of Mining Conflicts in Latin America, “In boom periods, windfall profits enable mining companies to obtain favours from national political actors, despite their meager contributions in royalties and taxes. When mineral prices go bust, they lobby for weaker social and environmental standards and for state subsidies through exemptions from taxes and other obligations that every economic activity should normally meet” (quoted by Moore, 2017).

The theme of the state as enabler and facilitator in the context of global forces and flows is also germane to the case of land and water grabs. Both land grabs and mining are linked to a circuit of investment discourse and practice, whereby the perceived need for FDI is coupled with “reform” that scales down protections for labour and harnesses state infrastructural and financial contributions to private sector extraction activities (Le Billon and Sommerville, 2017). Governments in “grabbing” countries are often active protagonists, partly out of attention to domestic food security (regardless of the food sovereignty effects on countries subject to grabs); state actions that facilitate such acquisitions within their borders may reflect “unwavering faith in the role of foreign investment in national economic development” (German, Schoneveld, and Mwangi, 2011, p. 2) or potential gains for politically connected local elites (Ansoms, 2011; Borras and Franco, 2012). Some governments, such as Ethiopia's, have nationalized large tracts of land only to resell to private interests, simultaneously forcing local farmers and pastoralists onto unproductive land (Human Rights Watch, 2012). A study of coerced dispossession from agricultural land (“grabbed

commons”) found that “most of the cases of conflict (including violent and non-violent conflict) emerged when the land was acquired through government lease, and such leases were mainly for large-scale crop production” (Dell'Angelo et al., 2017b, p. 8).

It is also important to situate these issues with reference to corporate home countries and source countries for investment. For example, the Canadian government, since the 1990s and across political party lines, has facilitated extractive imperialism in Latin America and beyond, intertwining domestic corporate and foreign policy (Studnicki-Gizbert, 2016; Veltmeyer, 2013). Domestically, the Canadian government sustains the mining industry by providing favourable tax regimes, including tax credits and subsidized equity financing, especially for junior exploration firms operating both domestically and internationally.<sup>4</sup> Further, Canada's lax securities laws create an environment of lenient corporate governance, where until very recently lawsuits against Canadian TNCs related to their activities outside Canada could not be heard in Canadian courts (Dougherty, 2013). Internationally, Canada officially promotes the mining industry via development projects and formal diplomatic channels, providing tacit and active support for the nexus of undemocratic governance, military intervention, and weak environmental and tax/royalty legislation throughout Latin America (Gordon and Webber, 2016; Heidrich, 2016), which might be dubbed “unhealthy diplomacy.”

In recent years between half and two-thirds of all mining TNCs have been headquartered in Canada (Natural Resources Canada, 2018), with 59% of global mining financing passing through *Toronto stock exchanges* in 2017 (TMX, 2018). As such, the ethical, and legal, responsibility of companies based in Canada and other high-income countries (HICs) for the conduct of their subsidiaries and affiliates in LMICs is a transcendent (health) issue in the realm of global extraction and global governance for health more generally.

Yet the case of mining in Latin America is also instructive as an antidote to fatalism (Bebbington et al., 2008; Conde, 2017; Kirsch, 2014; McDonnell, 2015; Paredes, 2016). In 2013 the Chilean government suspended and fined the massive open-pit Pascua-Lama gold mine (and copper and silver projects) straddling the border with Argentina due to investor Barrick Gold's environmental violations and company manipulation of data on the contamination and depletion of fresh water (Urkidi, 2010; Working Group, 2014). In the most notable and unlikely initiative to date, in 2017 El Salvador—economically, politically, and socially beleaguered by drug trafficking in the wake of a highly destructive civil war—passed a nationwide ban on metal mining (MiningWatch, 2017b). This ban was enacted after El Salvador was subject to a lengthy \$300 million investor-state dispute settlement suit for denying digging rights to Australian/Canadian conglomerate Oceana Gold due to environmental assessment violations and contamination of the country's principal drinking water source during prospecting (Moore et al., 2014). Costa Rica also has a major mining ban in place, and other Central and South American countries are contemplating alternatives to “plunder extractivism” (Broad and Fischer-Mackey, 2016). These efforts have not only challenged centralized government decision making processes but also galvanized social movements to work with a variety of actors and institutions “to reclaim the right of affected populations and indigenous peoples to participate, in empowering forms, in high-stake decisions that affect their territories, livelihoods and futures” (Walter and Urkidi, 2017, p. 265).

<sup>4</sup> Canada is hardly the only home to mining TNCs—the United Kingdom, Australia, the United States, and China are also major players, and many of the problems that have arisen in Latin America have counterparts in Africa and elsewhere, albeit involving different protagonists. In sub-Saharan Africa, for instance, Australian mining companies have the largest presence in terms of number of companies (Fitzgibbon et al., 2015).

## 5. Pathways

As the next step in our analysis, we distinguish five generic pathways (Fig. 1) to demonstrate in greater detail the interconnections among global political economy factors, national politics and institutional/policy factors, and health outcomes. These are: 1) effects on poverty and inequality; 2) workplace hazards; 3) environmental degradation; 4) dispossession and loss of livelihoods; and 5) violence and conflict. These involve both direct mechanisms, such as workplace and environmental exposures, and indirect mechanisms linked to such variables as the use of oil and mining revenues. There is also some overlap among these categories, for example when environmental degradation is associated both with exposures to hazardous contaminants and with loss of livelihoods. Nonetheless, the pathways remain analytically indispensable.

### 5.1. Effects on poverty and inequality

The presumption that growth associated with extractive industries will create jobs and increase governments' fiscal capacity (in theory enabling increased investment in health systems and social protection) is widespread, if often implicit. For example, the World Bank estimates that in 2016, "IFC's oil, gas and mining client companies contributed approximately US\$2500 million to government revenues" (World Bank, 2017, p. 4) and "created or sustained about 60,000 direct jobs." Even if accurate, this indicates a modest employment contribution at best, and it is a *gross* rather than a *net* figure; it does not take into account livelihoods lost as a result of the activities in question.

Given the pervasive influence of poverty on health, within and across generations (Kelly et al., 2014), it is worth paying attention to the 13 specific potential mechanisms linking extractive industries to either poverty reduction or poverty exacerbation identified by Gamu et al. (2015) based on an important review of empirical studies (see Table 1); their provisional conclusion is that industrial mining is more frequently associated with worsening poverty than with reducing it. In one country, Peru, mining has been found to have positive economic and social effects in districts where it actually takes place, but with few spillovers outside the local area and with an "inequalizing impact ... both within and across districts" (Loayza and Rigolini, 2016, p. 219). Elsewhere, with certain exceptions such as Norway, whose welfare state predated its oil boom, extractive economies face difficulties in establishing strong welfare states (Acemoglu and Robinson, 2013), such as in Bolivia (Kröger and Lalander, 2016).

In Nigeria, Africa's largest oil exporter, official figures show a consistent increase in poverty over more than three decades (UNDP, 2015, p. 21–22), while oil wealth remains extremely concentrated (Wallis, 2014). In Angola, the continent's second largest oil exporter, the capital Luanda ranks as the world's most expensive city (Ngugi, 2017) and luxury amenities proliferate, while the poor live literally in the shadows of the towers occupied by the rich and powerful (Lyons, 2016; Specter, 2015; UNICEF, 2015). This is a middle-income country, on World Bank criteria, but one masking huge inequality: 30% of the population lived below the World Bank's extreme poverty threshold in 2008, *before* the

oil price collapse. In 2016, post-collapse, professional auditors noted that "[n]o less than 80% of the country's consumables are imported. The National Bank has limited foreign currency; the Kwanza has devalued considerably, and the shelves in the shops are empty, while fuel prices have gone up. Public services have been cut to reduce government spend[ing], resulting in rubbish on the streets and a yellow fever outbreak" (Pricewaterhouse Coopers, 2016, p. 23; on the yellow fever outbreak, concentrated in Luanda, see WHO, 2016). The Chad-Cameroon pipeline appears actually to have increased poverty in the oil-producing region of Chad (Aristide and Moundigbaye, 2017) despite the World Bank's "unprecedented efforts designed to ensure that oil revenues would be used for priority social investments in Chad" (Horta, 2010, p. 7; the World Bank financed the project through the IFC, but eventually withdrew due to Chad's failure to comply with social investment measures).

### 5.2. Workplace hazards

Mining has had a deplorable occupational health record due to miners' ongoing exposure to carcinogens, lung-disease inducing dust, toxic mercury vapour, and high rates of injury and death from underground explosions, equipment failure, and mining collapse (Cartwright, 2016; Elgstrand et al., 2017). Despite the increasing use of robotics, mining remains one of the world's most hazardous occupations in terms of deaths and injuries per capita (International Labour Organization, 2017). Birn et al. (2017, pp. 94–95) present a case study of how substandard working conditions, a legacy of apartheid, continuing high levels of economic inequality, and reliance on migrant labour, have contributed to persistently high levels of tuberculosis among South African miners. Coal mining in India, Turkey, China, Russia, and elsewhere is a key cause of lung ailments among miners and nearby populations due to high concentrations of particulate matter from extractive processes (Hota and Behera, 2015). Because miners are often recruited to work in remote areas, they also face a range of health problems linked to migrant work, including racialized exploitation, human trafficking and underage employment, sexually transmitted infections, and mental health and substance use problems (Carney and Gushulak, 2016; Upadhyay and Ranjan, 2016).

Artisanal mining is notoriously unregulated and dangerous, with extensive documentation of harm to miners and their families and contamination of nearby land and waterways in many regions of the world (Amnesty International, 2016; Armah et al., 2013; Awomeso et al., 2017; de Souza et al., 2017; Salazar-Camacho et al., 2017; Xiao et al., 2017). In addition to being deprived of education, child labourers involved in gold artisanal mining, including in Mali, Tanzania, and Ghana, report a range of respiratory and musculoskeletal symptoms (Human Rights Watch, 2011, 2013, 2015).

Sand mining similarly entails serious, if insufficiently researched, occupational health and safety hazards. The physically intensive nature of manual sand mining, for instance, can bring about musculoskeletal problems, ear and eye pain, and sensory deficits in hands and feet (Mohapatra et al., 2017). In India, civil society groups have documented fatalities among divers who descend up to 120 feet underwater

**Table 1**  
Candidate mechanisms linking mining, oil and gas extraction and changes in poverty (adapted from Gamu, Le Billon, and Spiegel, 2015).

Mechanisms tending to reduce poverty	Mechanisms tending to increase poverty
1. Extractive industries as catalyst for growth	1. Economic underperformance of resource-rich economies
2. Revenues used to support increased investment in health care and education	2. Increased unemployment in other sectors as agricultural and manufacturing workers displaced
3. Direct employment	3. Exacerbation of inequality
4. Upstream and downstream economic linkages	4. Employment volatility (the boom and bust cycle)
5. Private (i.e. corporate) investment in infrastructure	5. Economic enclaves
6. Corporate social responsibility (CSR) initiatives	6. Rent-seeking and corruption
	7. Environmental and social impacts

to collect sand (Rege, 2016).

In the case of agribusiness and land grabs, a seriously neglected issue is worker exposure to pesticides associated with input-intensive monocultures that often follow large-scale agricultural land acquisitions by foreign actors. An estimated 3.5–5 million poisonings and 250,000 deaths occur annually due to unsafe pesticide use (Marrs and Karalliede, 2012), and there are substantial risks to human health from pesticide contamination of water tables (Neto et al., 2014).

### 5.3. Environmental degradation

Mining operations typically leave behind a trail of devastation (London and Kisting, 2016): open pits and stripped terrain; deadly mudslides and water contamination; and improper disposal of mine tailings that leads to seepage of heavy metals, cyanide, acids, and other toxic by-products into land and rivers (Roche et al., 2017). In the leaching processes used in large-scale gold mining, for example, cyanide solutions are sprayed onto mammoth piles of low-grade ore to extract gold flakes. It can take up to 30 tons of ore to produce one ounce of gold, a process which leaves behind huge quantities of cyanide-laced tailings filling reservoirs that often leak and contaminate fish and water supplies (Eisler and Wiemeyer, 2004). Mining of silver, copper (Latin America is the leading producer of both of these), gold, zinc, tin, and other naturally abundant minerals both consumes enormous quantities of water and heavily contaminates watersheds and agricultural land. Acids and heavy metals (cyanide, mercury, arsenic, etc.) that are improperly dumped cause extreme water and environmental stress in the Peruvian highlands, El Salvador's main freshwater source (the Río Lempa), and hundreds of other locales across the continent (e.g. on Guatemala, see Basu and Hu, 2010). Artisanal mining is also implicated: women in Indonesia, Kenya, and Myanmar have been found to suffer from high mercury burden, most likely linked to small-scale gold mining (via burning of mercury amalgam and water contamination of fish stocks). Mercury's harmful effects (Minamata disease, notorious from neurotoxic exposures in Japan and northern Ontario) include brain damage, especially to the developing fetus, and kidney and cardiovascular disease (Bell et al., 2017; Gibb and O'Leary, 2014).

Environmental devastation associated with oil and gas extraction in sub-Saharan Africa is best documented in the Niger Delta, where it has been estimated that in the 50 years before 2006 the volume of oil spilled was equivalent to one Exxon Valdez spill every year, turning the Delta into “one of the most oil-impacted ecosystems in the world” (Federal Ministry of Environment et al., 2006). An extensive environmental assessment in 2011 documented hazardous exposures to hydrocarbons in air pollution as well as widespread contamination of surface and ground water with substances including benzene (a notorious carcinogen), and made numerous recommendations for urgent action (UNEP, 2011). Five years later, an assessment of the effectiveness of attempts at regulation found that of the 27 recommendations, “only three (had) been partially implemented,” and blamed both “the persistent lack of political will on the part of the Nigerian government, and the grossly nonchalant attitude by Shell” (a subsidiary of Royal Dutch Shell and the major private sector operator in the region) (Yakubu, 2017).

A special concern in the Nigerian case is flaring: burning off at the wellhead of natural gas that occurs in association with oil extraction (Environmental Rights Action and Friends of the Earth Nigeria, 2005; Izarali, 2016). Exposure to the multiple airborne contaminants associated with flaring “is known to cause human health risks such as cancer, neurological, reproductive and developmental effects” (Ite and Ibok, 2013, p. 74). The volume of gas flared in recent years has declined, but official deadlines aimed at ending the practice have repeatedly been missed or ignored (Orji, 2014), while the nature of the health effects means that they will continue to manifest for many years, perhaps intergenerationally. Health-damaging pollution has been observed both in the oil-producing regions of Chad and on the

Cameroonian coast (Horta, 2012, pp. 218–19), although little detail is available. Indeed, limited availability of research on the environmental and health effects of oil and gas extraction in sub-Saharan Africa is an ongoing problem.<sup>5</sup>

Sand mining threatens water security and quality by depleting groundwater around rivers (Sreebha and Padmalal, 2011; UNEP, 2014), especially affecting women in settings where they have the primary responsibility of securing water for their households (Pereira and Ratnayake, 2013). Access to safe drinking water is also endangered by mining of coastal dunes, which are natural barriers preventing salt water intrusion into freshwater aquifers (Jonah et al., 2015; Padmalal and Maya, 2014). Furthermore, this practice also generates inland erosion of riverbanks and forest degradation from sand mining beneath and around forests. Abandoned mining pits collect rainwater, becoming mosquito breeding grounds that facilitate the spread of malaria and other vector-borne diseases (Adedeji et al., 2014). Sand mining is also implicated in climate change, with the cement industry accounting for 5% of all global CO<sub>2</sub> emissions (even before accounting for the emissions from sand transportation) (Rubenstein, 2012).

### 5.4. Loss of livelihoods and dispossession

Adequate nutrition is, of course, one of the most basic social determinants of health. Effects of land grabs on food security and sovereignty vary widely depending on the local context, but in particular when croplands that are already in production are acquired, “[t]he loss of cropland to a large investor has a direct impact on the food security and livelihood strategies of the smallholder farmers affected. ... Land considered to be ‘marginal’ often serves as a grazing area and is important to rural communities and indigenous peoples” (Nolte et al., 2016, p. 36). Because land acquisitions often entail a change in land use from local food production to agricultural exports, land grabs can “exclude the local population from the access to potentially highly productive agricultural land that, even without major investments, could produce enough food to sustain about 190–235 (minimum number depending on the diet) million people” (Rulli and D'Odorico, 2014, p. 7). This is not a direct measure of the increased domestic food insecurity associated with land acquisitions for export but is an important indication of scale, and from an equity perspective “vulnerable communities within vulnerable countries (i.e. those most impacted by changes in food prices) are also those more susceptible to livelihood loss due to the land rush” (Davis et al., 2014, p. 188). Additional issues involve loss of forester livelihoods and biodiversity, for example as forests are cleared to make way for biofuel or palm oil plantations.

Sub-Saharan Africa is the world's lowest-income region, and low agricultural productivity is an ongoing concern. It is therefore significant that Africa is also the most targeted continent for land grabs, with land deals since 2000 comprising more than 10 million hectares, despite what has been described as a “looming crisis” of arable land availability in the continent (Gettleman, 2017), with disturbing implications for future food sovereignty. Further, due to their capital-intensive methods, the agricultural practices associated with “grabbed” land tend to create few employment opportunities that generate local income (Nolte et al., 2016, p. 46; see also Aguilar-Støen, 2016; Borrás and Franco, 2013), and in fact may follow on various forms of coerced dispossession (Dell'Angelo et al., 2017a, b), thus concentrating the negative impact of land grabs among the most vulnerable.

A further set of potential health consequences arises from the virtual

<sup>5</sup> Conducting even basic fieldwork or epidemiological studies is difficult (Baumüller et al., 2011, p. 17), and official statistics can be unreliable or concealed. The author of one of the few fieldwork-based monographs on oil industry impacts notes: “Eventually a uniquely forthright [Angolan] government official told me that all statistics are considered politically charged. He divulged the government's fear that information on topics ranging from environmental emissions to basic population statistics by province could be used to criticize the ruling party” (Reed, 2009, p. 13).



water trade that is part and parcel of land grabs, which may affect water security as local water resources are diverted, depleted, and ultimately alienated for export production (Franco et al., 2013). Concentration of land deals along the River Nile, the Senegal River, and the Niger River suggests that water access motivates acquisitions in some regions (Nolte et al., 2016, p. 17; on the ongoing contests over water in the Nile basin see Andrews-Speed et al., 2015, pp. 147–158).

Beyond the direct health damages resulting from extraction, environmental degradation and land displacement also jeopardize farming, fisheries and forestry, particularly affecting Indigenous livelihoods and lands. High levels of poverty and losses of livelihood associated with pollution that disproportionately affect the poorest fishers have been documented in oil-producing regions of Angola (Reed, 2009), although little detail is available. In the Andes, mining-related contamination and depletion of water has negatively affected agriculture and livestock raising. As well, (forced) displacement of farmers by mining companies onto smaller plots or into towns has shrunk communal grazing lands and threatened land-based livelihoods (Brain, 2017; Helwege, 2015).

In the case of sand mining, rich topsoil is removed for sand extraction, harming the agricultural viability of land and farmers' livelihoods (Adedeji et al., 2014). For commercial and subsistence fishing, sand mining's impact on coastal erosion is a major issue: it increases rock exposure on the coast, making it difficult to launch and land fishing boats. Additionally, the availability of fish is affected by ecosystem damage to habitats and spawning grounds and by water pollution brought on by sand dredging (Adesina and Adunola, 2017; Global Witness, 2010; Kim and Grigalunas, 2009; Sowunmi et al., 2016). Furthermore, the aesthetic devastation to beaches caused by extensive mining hurts coastal tourism—yet another source of livelihood in many settings (Jonah et al., 2015).

Intertwined with, but also going beyond, the material dimensions of loss of livelihood, the health effects of social dislocation must be considered with reference to the important synthesis by Whitehead et al. (2016) of evidence on how lack of “control over destiny” generates negative health outcomes across multiple scales, including at the macro level through “traumatic social transitions”. Expulsion and dispossession are particularly linked to the systematic oppression of Indigenous populations, whose lands and territories are especially targeted for their mineral riches, which are abundant in part thanks to their rural and remote location and longstanding non-depleting uses of land and water resources consistent with Indigenous ways of life (Caxaj et al., 2012; Gordon and Webber, 2008). In the Philippines archipelago, for instance, more than half of locales identified in mining applications are in Indigenous areas (Holden et al., 2011).

### 5.5. Violence and conflict

The dispossession of land and livelihoods linked to extractive development has long been accompanied by violent government, paramilitary, and private security firm suppression of activist opposition (Imai, 2017; Middeldorp et al., 2016; Spring, 2016). In Guatemala in the 1960s, a subsidiary of Canada's International Nickel Company (INCO) obtained military support to forcibly remove thousands of Indigenous residents to secure a mine, leading to 3000–6000 deaths (Fox, 2015). Across Latin America, deaths threats and extreme human rights violations—perhaps most egregiously in Colombia (Rochlin, 2015)—have involved killings at protests and demonstrations, criminalization of dissent, as well as targeted assassinations, under the direction or tacit approval by mining companies and national governments. The Observatory of Mining Conflicts in Latin America (Observatorio de Conflictos Mineros de América Latina, 2017) documents 219 current mining conflicts in Latin America, affecting over 330 overwhelmingly Indigenous communities. In recent decades, thousands of environmental activists have been killed across the region (Watts and Vidal, 2017). Worldwide, the civil society organization Global Witness

(2016, 2017; Watts, 2018) recorded 185 killings of environmental activists in 2015, 201 in 2016, and 197 in 2017 (opponents of mining and oil activity were the largest targeted category in 2015 and 2016, while agribusiness and mining opponents were the most targeted in 2017).

The civil society organization MiningWatch Canada has tracked hundreds of human rights complaints against Barrick Gold, the world's largest gold mining TNC. Barrick's mine in Papua New Guinea has been linked to excessive use of force by the mine's security staff, and the rape and gang rape of over 100 women, and its Tanzania mine is linked with targeted killing of artisanal miners and activists (MiningWatch Canada, 2017a). In India, “sand mafias” involving corporate (mining and construction companies), political, and law enforcement actors employ intimidation tactics and violence (including assassination) against activists, other officials, and villagers who threaten the operation of illegal sand mining operations (Beiser, 2015; Martínez-Alier et al., 2014; Rege, 2016).

Beyond these effects is the frequency of brutal conflict over mineral resource control, most notably in the First and Second Congo wars in the late 1990s and 2000s in the DRC, during which more than five million people died. Fighting was exacerbated by competition over control of lucrative gold, tin, diamond, uranium, copper, zinc, and cobalt deposits, involving both national and TNC interests (van Reybrouck, 2014). A UN Security Council Panel of Experts (2003) found that the commercial activities of over 100 transnational mining companies contributed to and benefited from the DRC wars, but Canada, Australia and other OECD governments where mining companies are based have failed to investigate the role of these corporations in the conflict (Kneen, 2009).

## 6. Into the future: Understanding and addressing/challenging the global extractive order

Our case examples illustrate multiple pathways between extractive industries and (largely negative) health outcomes via a range of societal determinants of health, from workplace and environmental exposures to illicit outflows of profits. Most obviously, an urgent need exists for multidisciplinary health research that describes in greater, context-specific detail the direct and indirect health effects of what might be called a global extractive order. The extraction of multiple commodities, the ones studied here and many others, routinely proceeds in a way that is essentially predatory under conditions of neoliberal globalization. Conventionally, the power asymmetry most often noted is that between TNCs—with their abundant finances, technological sophistication, and access to global commodity chains—and national governments of LMICs. But even greater asymmetries exist between corporate-governmental alliances (in both HICs and LMICs) and the local communities affected by the “structural violence” of resource extraction, a prime example being the political and legal privileging of (foreign) investor rights over local community livelihoods in Colombia and Brazil (Srikantia, 2016).

It is important to note, as well, the elision of conventional North-South distinctions: many land grabs manifest an “emerging ‘North-South-South’ dynamic” (Land Deal Politics Initiative, 2012; see also Rulli et al., 2013). For example governments in China, South Africa, and several countries in the Middle East or companies based in those countries are actively involved in land acquisitions; companies based in Brazil and India, among other settings, are originating acquisitions while at the same time land in those countries is being acquired by foreign actors. And TNCs based in the Global South do not necessarily make more ethical players than their Northern counterparts, as shown by the actions of Brazilian mega-mining corporation Vale in settings as distinct as Mozambique and Northern Ontario, where it has pursued a heavy-handed policy against unions and labour laws and given short shrift to safety measures, resulting in soaring fatalities (Marshall, 2015).

Future research on the global extractive order and health must draw on country- and region-specific expertise that often resides far outside the conventional remit of health research to identify homologies among



superficially dissimilar contexts and industries. The ideal would be a program that included a sophisticated mapping component to enable visualized worldwide tracking of where extraction takes place, for what purposes, to be traded where, and affecting the health of whom (and how), as well as the political economy underpinnings in terms of tracking ownership, financial flows, and special impacts on Indigenous populations. Much of this information is available but is scattered through a multitude of sources, and commodity-by-commodity presentation tends to inadequately convey the contours of the extractive order and its associated systemic imbalances. Another central issue for future research involves analysis of how deeply intertwined the extractive order is with militarism and war: violent conflict is, arguably, often essential to extraction (Downey et al., 2010; Le Billon, 2013). Conversely, natural resource revenue sharing mechanisms may enable lasting peace in areas beset by resource conflicts (Le Billon and Nicholls, 2007).

To be most effective, such a research program would need to be backed with the resources and infrastructure for secure contact with the public-interest civil society organizations that, in many regions, provide or possess the best source of data on extractive industries—often at considerable personal risk. Yet reliance on civil society brings its own dilemmas. As valuable as civil society has been in pressing for a variety of instruments seeking to govern TNCs, civil society should not be expected to shoulder the burden of holding extractive interests to account, or to replace the roles of UN agencies and national/subnational governments in protecting populations and the environment from harm, and promoting health and well-being (Birn et al., 2017, pp. 603–645), especially given the high and sometimes fatal costs of doing so.

Exploring the potential for global initiatives to address the governance and health challenges presented by the global extractive order would require another article (in progress). Important in this context are proposals to address the shortcomings of existing governance mechanisms not only through a variety of measures to control corruption (e.g. Siegle, 2009), but also through such instruments as a treaty on business and human rights that would, for example, close loopholes around complex corporate structures that fail to hold parent companies accountable for the human rights abuses of their subsidiaries (Correa, 2016). These and other initiatives must also confront fundamental questions related both to political accountability and to the structure of the current global extractive order. Such questions raise the issue of whether the primary focus should be on particularly pernicious players and venal practices (the “few bad eggs” approach), while the overall structures and rules enabling “big extraction” remain in place and business continues as usual, or whether the challenge is rather one of developing entirely new, more equitable alternatives to the current extractive order and associated distributions of harm and benefits?

The most basic governance issues—those of accountability and transparency—are addressed by Siegle's argument for “the normative principle that natural resource revenues belong to all citizens of the endowed country,” with the corollary that “the norm that all natural resource contracts must be ratified by democratic legislatures” should be instituted and promoted by international institutions (2009, pp. 49–50). Similarly, Wenar (2008, p. 15) argues that: “The most salient reform of international commerce must be to remove the ‘might makes right’ rule that vests the right to sell resources in whoever can control a population by force,” or via a variety of autocratic and unaccountable institutions. The extent of the contrast between such norms, however unexceptionable they may seem, and the current state of the world is hard to overstate. More promising, perhaps—and especially intriguing in the context of the Sustainable Development Goals (SDGs)—is Schuppert's (2014) proposal for an International Court for the Environment that balances claims for self-determination with responsibilities in terms of such principles as doing “no harm, precaution, equitable use, sustainable use, sustainable development, and inter-generational equity,” and the polluter pays principle (p. 90).

Yet even if formidable political obstacles can be overcome, are the

health dimensions of the extractive order sufficiently addressed by adherence to equity principles and better control of environmental and workplace exposures, tax and royalty regimes that return more resources to national treasuries, and routine transparency with regard to revenue structures and capital flight? (The world order is admittedly a long way from achieving any of these.) Or is the issue rather one of designing structures of global governance and accountability that change entire industries, in ways analogous (and complementary) to the necessary transition to a low- or post-carbon economy?

In this vein, what are the implications of the argument that growth in the global economy's overall throughput of resources must be moderated, if not reversed, in order to keep a variety of biospheric life support mechanisms that are essential to health from being destroyed (Steffen et al., 2015)? A growing chorus of analysts argue that there is now ample evidence demonstrating that today's extractive order is sufficiently destructive of health that the entire premise of the global economy needs to be rethought and revolutionized according to a relationship of harmony and equity among and across peoples and the natural world (see e.g. D'Alisa et al., 2015; Demaria et al., 2013; Villalba, 2013). Or if a reformist approach is all that can be mustered, what resource throughputs, extractive activities, and re-usability mechanisms are ethically acceptable while being consistent with the economic distribution (and/or growth) needed to meet such SDG targets as eliminating extreme poverty and reducing multidimensional poverty by 2030? How compatible are current patterns of land acquisition and crop exports with the multiple targets related to ending hunger? (These are just examples.) Against this background, and above and beyond the importance of national-level political reforms, what would a minimally adequate mechanism for equitable global governance for health of the extractive order look like? These are larger questions than the ones raised in this article, but they cannot be ignored.

## Acknowledgements

The research for this article was carried out as part of the work of the University of Oslo Independent Panel on Global Governance for Health, with partial financial support (including support for open access publication) from the University of Oslo (120485). However, the views expressed are exclusively those of the named authors, who contributed equally to the manuscript but are named in reverse alphabetical order. We are grateful to Leah Shipton for research and editing support.

## References

- Acemoglu, D., Robinson, J.A., 2013. *Why Nations Fail: the origins of power, prosperity and poverty*. Random House, New York.
- Adediji, O.H., Adebayo, H.O., Sotayo, E.I., 2014. Assessing environmental impacts of inland sand mining in parts of Ogun State, Nigeria. *Ethiop. J. Environ. Stud. Manag.* 7, 478–487.
- Adesina, T.K., Adunola, O.A., 2017. Perceived effects of sand dredging on livelihood diversification of artisanal fisher folks in Lagos State, Nigeria. *Agric. Trop. Et. Subtrop.* 50, 71–79.
- Agbese, P.O., 2015. Corporate irresponsibility: the culpability of local and foreign firms in corrupt practices in Nigeria. In: Vajpeyi, D.K., Oberoi, R. (Eds.), *Corporate Social Responsibility and Sustainable Development in Emerging Economies*. Lexington Books, Lanham, MD, pp. 299–322.
- Aguilar-Støen, M., 2016. Beyond transnational corporations, food and biofuels: the role of extractivism and agribusiness in land grabbing in Central America. *Forum Dev. Stud.* 1–21.
- Amnesty International, 2016. “This is What We Die For”: Human Rights Abuses in the Democratic Republic of Congo Power the Global Trade in Cobalt. Amnesty International, London Retrieved from: <<https://www.amnesty.org/en/documents/afr62/3183/2016/en/>>.
- Andrews-Speed, P., Bleischwitz, R., Boersma, T., Johnson, C., Kemp, G., Vandeeveer, S., 2015. *Want, Waste or War? The global resource nexus and the struggle for land, energy, food, water and minerals*. Routledge, Abingdon.
- Ansoms, A., 2011. The ‘bitter fruit’ of a new agrarian model: Large-scale land deals and local livelihoods in Rwanda. In *International Conference on Global Land Grabbing*, Institute of Development Studies, Brighton, UK. Bellville, South Africa: Land Deal Politics Initiative. Retrieved from: <[http://www.future-agricultures.org/papers-and-presentations/doc\\_download/1265-the-bitter-fruit-of-a-new-agrarian-model-large-scale-land-deals-and-local-livelihoods-in-rwanda](http://www.future-agricultures.org/papers-and-presentations/doc_download/1265-the-bitter-fruit-of-a-new-agrarian-model-large-scale-land-deals-and-local-livelihoods-in-rwanda)>.

- Aristide, M., Moundigbaye, M., 2017. Oil and regional development in Chad: assessment of the impact of the Doba oil project on poverty in the Host region. *Afr. Dev. Rev.* 29, 42–55.
- Armah, F.A., Luginaah, I.N., Taabazuing, J., Odoi, J.O., 2013. Artisanal gold mining and surface water pollution in Ghana: have the foreign invaders come to stay? *Environ. Justice* 6, 94–102.
- Awomeso, J.A., Taiwo, A.M., Dada, E.O., Ayantobo, O.O., 2017. Human health and environmental assessments of small-scale and artisanal mining activities in the Gold City of Ijeshaland, Southwestern Nigeria. *Environ. Syst. Res.* 6, 18.
- Basu, N., Hu, H., 2010. Toxic Metals and Indigenous Peoples near the Marlin Mine in Western Guatemala: Potential Exposures and Impacts on Health. Physicians for Human Rights, Cambridge, MA.
- Baumüller, H., Donnelly, E., Vines, A., Weimer, M., 2011. The Effects of Oil Companies' Activities on the Environment, Health and Development in Sub-Saharan Africa, EXPO/B/DEVE/FWC/2009-01/Lot5/11. Brussels: Policy Department, Directorate-General for External Policies of the Union. European Parliament Retrieved from: [http://www.europarl.europa.eu/RegData/etudes/etudes/Join/2011/433768/EXPO-DEVE\\_ET\(2011\)433768\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/Join/2011/433768/EXPO-DEVE_ET(2011)433768_EN.pdf).
- Bebbington, A., Bebbington, D.H., Bury, J., Lingán, J., Muñoz, J.P., Scurrah, M., 2008. Mining and social movements: struggles over livelihood and rural territorial development in the Andes. *World Dev.* 36, 2888–2905.
- Beiser, V., 2015. The deadly global war for sand. *Wired* [On-line]. Retrieved from: <https://www.wired.com/2015/03/illegal-sand-mining/>.
- Bell, L., Evers, D., Johns, S., Regan, K., DiGangi, J., Federico, J., et al. 2017. Mercury in Women of Child-bearing Age in 25 Countries. Göteborg: IPEN and Biodiversity Research Institute.
- Birn, A.-E., Pillay, Y., Holtz, T., 2017. *Textbook of Global Health*, 4th ed. Oxford University Press, New York.
- Blane, D., Kelly-Irving, M., d'Errico, A., Bartley, M., Montgomery, S., 2013. Social-biological transitions: how does the social become biological? *Longitud. Life Course Stud.* 4.
- Borras, S.M., Franco, J.C., 2012. Global Land Grabbing and Trajectories of Agrarian Change: A Preliminary Analysis. *Third World Q.* 12, 34–59.
- Borras, S.M., Franco, J.C., 2013. Global Land Grabbing and Political Reactions 'From Below'. *Third World Q.* 34, 1723–1747.
- Brain, K.A., 2017. The impacts of mining on livelihoods in the Andes: a critical overview. *Extr. Ind. Soc.* 4, 410–418.
- Broad, R., Fischer-Mackey, J., 2016. From extractivism towards buen vivir: mining policy as an indicator of a new development paradigm prioritising the environment. *Third World Q.* 1327–1349.
- Buying farmland abroad: Outsourcing's third wave, 2009. May 21). *Economist*. Retrieved from: <http://www.economist.com/node/13692889>.
- Cáceres, D.M., 2015. Accumulation by dispossession and socio-environmental conflicts caused by the expansion of agribusiness in Argentina. *J. Agrar. Change* 15, 116–147.
- Carney, J.G., Gushulak, B.D., 2016. A review of research on health outcomes for workers, home and host communities of population mobility associated with extractive industries. *J. Immigr. Minor Health* 18, 673–686.
- Carr, J.A., D'Odorico, P., Laio, F., Ridolfi, L., 2013. Recent history and geography of virtual water trade. *PLoS One* 8, e55825.
- Cartwright, E., 2016. Mining and its health consequences. In: Singer, M. (Ed.), *A Companion to the Anthropology of Environmental Health*. John Wiley, Chichester, UK, pp. 417–434.
- Caxaj, C.S., Berman, H., Varcoe, C., Ray, S.L., Restoule, J.P., 2012. Tensions in anti-colonial research: lessons learned by collaborating with a mining-affected indigenous community. *CJNR (Can. J. Nurs. Res.)* 44, 76–95.
- Collier, P., 2008. October 7). A chance to crack down on Africa's loot-seeking elites. *Guardian*. Retrieved from: <http://www.guardian.co.uk/commentisfree/2008/oct/07/banking.regulation.africa>.
- Commission on Social Determinants of Health, 2008. Closing the Gap in a Generation: health equity through action on the social determinants of health (final report). World Health Organization, Geneva.
- Conde, M., 2017. Resistance to mining. A review. *Ecol. Econ.* 132, 80–90.
- Correa, C.M., 2016. Scope of the Proposed International Legally Binding Instrument on Transnational Corporations and Other Business Enterprises with Respect to Human Rights, Policy Brief No. 28. South Centre, Geneva Retrieved from: [https://www.southcentre.int/wp-content/uploads/2016/09/PB28\\_Scope-of-the-Proposed-International-Legally-Binding-Instrument-on-Transnational-Corporations-and-Human-Rights\\_EN.pdf](https://www.southcentre.int/wp-content/uploads/2016/09/PB28_Scope-of-the-Proposed-International-Legally-Binding-Instrument-on-Transnational-Corporations-and-Human-Rights_EN.pdf).
- Cotet, A.M., Tsui, K.K., 2013. Oil, Growth, and Health: What Does the Cross-Country Evidence Really Show? *Scand. J. Econ.* 115, 1107–1137.
- Curtis, M., Jones, T., 2017. Honest Accounts 2017: How the World Profits from Africa's Wealth. Global Justice Now, London Retrieved from: <http://jubileedebt.org.uk/wp-content/uploads/2017/05/Honest-Accounts-2017-WEB-FINAL.pdf>.
- D'Alisa, G., Demaria, F., Kallis, G., 2015. *Degrowth: A Vocabulary for a New Era*. Routledge, London.
- D'Odorico, P., Rulli, M.C., Dell'Angelo, J., Davis, K.F., 2017. New frontiers of land and water commodification: socio-environmental controversies of large-scale land acquisitions. *Land Degrad. Dev.* 28, 2234–2244.
- Daniel, S., Mittal, A., 2010. (Mis)Investment in Agriculture: The Role of the International Finance Corporation in Global Land Grabs. Oakland, CA: Oakland Institute. Retrieved from: [http://www.oaklandinstitute.org/pdfs/misinvestment\\_web.pdf](http://www.oaklandinstitute.org/pdfs/misinvestment_web.pdf).
- Dávila, F. R., ed. (2009). *Extractivismo, Política y Sociedad*. Quito: Centro Andino de Acción Popular y Centro Latinoamericano de Ecología Social.
- Davis, K.F., D'Odorico, P., Rulli, M.C., 2014. Land grabbing: a preliminary quantification of economic impacts on rural livelihoods. *Popul. Environ.* 36, 180–192.
- Dawe, D., Drechsler, D., 2010. Hunger on the rise: number of hungry people tops one billion. *Finance and Development*. pp. 40–41.
- de Souza, E.S., Texeira, R.A., da Costa, H., Oliveira, F., Melo, L., et al., 2017. Assessment of risk to human health from simultaneous exposure to multiple contaminants in an artisanal gold mine in Serra Pelada, Pará, Brazil. *Sci. Total Environ.* 576, 683–695.
- de Zayas, A., 2017. Report of the Independent Expert on the promotion of a democratic and equitable international order, A/HRC/36/40. New York: United Nations. Retrieved from: <http://daccess-ods.un.org/access.nsf/Get?Open&DS=A/HRC/36/40&Lang=E>.
- Dell'Angelo, J., D'Odorico, P., Rulli, M.C., 2017a. Threats to sustainable development posed by land and water grabbing. *Curr. Opin. Environ. Sustain.* 26–27, 120–128.
- Dell'Angelo, J., D'Odorico, P., Rulli, M.C., Marchand, P., 2017b. The tragedy of the grabbed commons: coercion and dispossession in the global land rush. *World Dev.* 92, 1–12.
- Dell'Angelo, J., Rulli, M.C., D'Odorico, P., 2018. The Global Water Grabbing Syndrome. *Ecol. Econ.* 143, 276–285.
- Dougherty, M.L., 2013. The global gold mining industry: materiality, rent-seeking, junior firms and Canadian Corporate Citizenship. *Compét. Change* 17, 339–354.
- Downey, L., Bonds, E., Clark, K., 2010. Natural resource extraction, armed violence, and environmental degradation. *Organ. Environ.* 23, 417–445.
- Eisler, R., Wiemeyer, S.N., 2004. Cyanide hazards to plants and animals from gold mining and related water issues. *Rev. Environ. Contam. Toxicol.* 183, 21–54.
- El Anshasy, A.A., Katsaiti, M.S., 2015. Are natural resources bad for health? *Health Place* 32, 29–42.
- Elgstrand, K., Sherson, D.L., Jørs, E., Nogueira, C., Thomsen, J.F., Fingerhut, M., et al., 2017. Safety and health in mining: Part 1. *Occup. Health South. Afr.* 23, 10–20.
- Els, F., 2017. Value of top 50 mining companies surge \$140 billion in 2017. *Mining.com* [On-line]. Retrieved from: <http://www.mining.com/value-top-50-mining-companies-surge-140-billion-2017/>.
- Environmental Rights Action & Friends of the Earth Nigeria, 2005. Gas Flaring in Nigeria: a Human Rights, Environmental and Economic Monstrosity. Climate Justice Programme, Friends of the Earth International, Amsterdam Retrieved from: [https://www.foe.co.uk/sites/default/files/downloads/gas\\_flaring\\_nigeria.pdf](https://www.foe.co.uk/sites/default/files/downloads/gas_flaring_nigeria.pdf).
- Fairbairn, M., 2010. Framing resistance: international food regimes and the roots of food sovereignty. In: Wittman, H., Desmarais, A., Wiebe, N. (Eds.), *Food Sovereignty: Reconnecting Food, Nature and Community*. Fernwood Publishing, Point Black, Nova Scotia, pp. 15–32.
- Federal Ministry of Environment, 2006. Nigeria Conservation Foundation, WWF UK, & CEESP-IUCN Commission on Environmental, Economic and Social Policy. Niger Delta Natural Resource Damage Assessment and Restoration Project. International Union for the Conservation of Nature, Gland, Switzerland Retrieved from: [https://cmsdata.iucn.org/downloads/niger\\_delta\\_natural\\_resource\\_damage\\_assessment\\_and\\_restoration\\_project\\_recommendation.docx](https://cmsdata.iucn.org/downloads/niger_delta_natural_resource_damage_assessment_and_restoration_project_recommendation.docx).
- Ferguson, J., 2005. Seeing Like an Oil Company: space, Security, and Global Capital in Neoliberal Africa. *Am. Anthropol.* 107, 377–382.
- Fitzgibbon, W., Hamilton, M.M., Schilis-Gallego, C.A., 2015. Australian mining companies digging a deadly footprint in Africa. *Int. Consort. Invest. J.* (On-line) Retrieved from: <https://www.icij.org/project/fatal-extraction/australian-mining-companies-digging-deadly-footprint-africa>.
- Fox, S., 2015. History, violence, and the emergence of Guatemala's mining sector. *Environ. Sociol.* 1, 152–165.
- Franco, J., Mehta, L., Veldwisch, G.J., 2013. The global politics of water grabbing. *Third World Q.* 34, 1651–1675.
- Gaffney, C., 2015. Gentrifications in pre-Olympic Rio de Janeiro. *Urban Geogr.* 1–22.
- Galeano, E., 1971. *Open Veins of Latin America: Five Centuries of the Pillage of a Continent*. Monthly Review Press, New York.
- Gamu, J., Le Billon, P., Spiegel, S., 2015. Extractive industries and poverty: a review of recent findings and linkage mechanisms. *Extr. Ind. Soc.* 2, 162–176.
- García-Bernardo, J., Fichtner, J., Takes, F.W., Heemskerk, E.M., 2017. Uncovering Offshore Financial Centers: Conduits and Sinks in the Global Corporate Ownership Network. *Scientific Reports*, 7, 6246.
- García-Rodríguez, J.L., García-Rodríguez, F.J., Castilla-Gutiérrez, C., Major, S.A., 2015. Oil, Power, and Poverty in Angola. *Afr. Stud. Rev.* 58, 159–176.
- Gary, I., Karl, T.L., 2003. Bottom of the Barrel: Africa's Oil Boom and the Poor. Catholic Relief Services, Baltimore Retrieved from: [http://www.justiceinitiative.org/db/resource2/fs/?file\\_id=15674](http://www.justiceinitiative.org/db/resource2/fs/?file_id=15674).
- German, L., Schoneveld, G., Mwangi, E., 2011. Contemporary processes of large-scale land acquisition by investors: case studies from sub-saharan africa. Center for International Forestry Research, Bogor.
- Gettleman, J., 2017. (July 29). Vanishing Land Fuels 'Looming Crisis' Across Africa. *New York Times*. Retrieved from: <https://www.nytimes.com/2017/07/29/world/africa/africa-climate-change-kenya-land-disputes.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=second-column-region&region=top-news&WT.nav=top-news>.
- Gibb, H., O'Leary, K.G., 2014. Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining community: a comprehensive review. *Environ. Health Perspect.* 122, 667–672.
- Gill, S., Benatar, S., 2016. Global health governance and global power: a critical commentary on the Lancet-University of Oslo Commission Report. *Int. J. Health Serv.* 46, 346–365.
- Global Construction Perspectives, 2015. *Global Construction 2030*. Global Construction Perspectives and Oxford Economics, London.
- Global Witness, 2010. Shifting Sand: how Singapore's demand for Cambodian Sand Threatens Ecosystems and Undermines Good Governance. Global Witness, London Retrieved from: [https://www.globalwitness.org/sites/default/files/pdfs/shifting\\_sand\\_final.pdf](https://www.globalwitness.org/sites/default/files/pdfs/shifting_sand_final.pdf).
- Global Witness, 2016. On Dangerous Ground. 2015's Deadly Environment: the Killing and Criminalization of Land and Environmental Defenders Worldwide. Global Witness, London.

- Global Witness, 2017. Defenders of the Earth: Global Killings of Land and environmental defenders in 2016. Global Witness, London Retrieved from: [https://www.globalwitness.org/documents/19122/Defenders\\_of\\_the\\_earth\\_report.pdf](https://www.globalwitness.org/documents/19122/Defenders_of_the_earth_report.pdf), [https://www.globalwitness.org/documents/18482/On\\_Dangerous\\_Ground.pdf](https://www.globalwitness.org/documents/18482/On_Dangerous_Ground.pdf).
- Goldman, M., 2011. Speculative urbanism and the making of the next World City. *Int. J. Urban Reg. Res.* 35, 555–581.
- Gordon, T., Webber, J.R., 2008. Imperialism and resistance: Canadian mining companies in Latin America. *Third World Q.* 29, 63–87.
- Gordon, T., Webber, J.R., 2016. Blood of Extraction: Canadian Imperialism in Latin America. Fernwood, Winnipeg.
- Haarstad, H., 2016. Natural resource extraction and the development conundrum. In: Grugel, J., Hammett, D. (Eds.), *The Palgrave Handbook of International Development*. Palgrave Macmillan UK, London, pp. 139–154.
- Halperin, S., 2013. Re-Envisioning Global Development: a Horizontal Perspective. Routledge, London.
- Harrington, B., 2016. Capital Without Borders: Wealth Managers and the One Percent. Harvard University Press, Cambridge, MA.
- Harvey, D., 2003. The 'New' imperialism: accumulation by dispossession. In: Panitch, L., Leys, C. (Eds.), *Socialist Register 2004: The New Imperial Challenge*. Merlin Press, London, pp. 63–87.
- Harvey, D., 2006. Neo-liberalism and the restoration of class power. *Spaces of Global Capitalism*. Verso, London, pp. 9–68.
- Hatcher, P., 2014. Regimes of Risk: the World Bank and the Transformation of Mining in Asia. Palgrave Macmillan, Houndmills.
- Heidrich, P., 2016. Determinants, boundaries, and patterns of Canadian mining investments in Latin America (1995–2015). *Lat. Am. Policy* 7, 195–214.
- Helwege, A., 2015. Challenges with resolving mining conflicts in Latin America. *Extr. Ind. Soc.* 2, 73–84.
- Henshaw, K., 2015. Enemy of big oil, Ken Saro-Wiwa showed power of resistance. *Green Left Wkly.* 1078. Retrieved from: <https://www.greenleft.org.au/content/enemy-big-oil-ken-saro-wiwa-showed-power-resistance>.
- High Level Panel on Illicit Financial Flows from Africa, 2015. Illicit Financial Flows: Report of the High Level Panel on Illicit Financial Flows from Africa. Addis Ababa, In: Proceedings of the AU/ECA Conference of Ministers of Finance, Planning and Economic Development. Retrieved from: <http://repository.uneca.org/bitstream/handle/10855/22695/b11524868.pdf?Sequence=3>.
- Hochschild, A., 1998. *King Leopold's Ghost*. Houghton Mifflin, Boston.
- Hoekstra, A.Y., Mekonnen, M.M., 2012. The water footprint of humanity. *Proc. Natl. Acad. Sci. USA* 109, 3232–3237.
- Holden, W., Nadeau, K., Jacobson, R.D., 2011. Exemplifying accumulation by dispossession: mining and indigenous peoples in the Philippines. *Geogr. Ann.: Ser. B, Human. Geogr.* 93, 141–161.
- Horta, K., 2010. The World Bank Group and the Chad-Cameroon Oil & Pipeline Project: 'the logic was sound, but reality interfered'. Group Chad, Berlin Retrieved from: [www.bankinformationcenter.org/en/Document.102151.pdf](http://www.bankinformationcenter.org/en/Document.102151.pdf).
- Horta, K., 2012. Public-Private Partnership and Institutional Capture: the State, International Institutions, and Indigenous Peoples in Chad and Cameroon (pp) In: Sawyer, S., Gomez, E.T. (Eds.), *The Politics of Resource Extraction: Indigenous Peoples, Multinational Corporations and the State*. Palgrave Macmillan UK, London, pp. 204–229.
- Hota, P., Behera, B., 2015. Coal mining in Odisha: an analysis of impacts on agricultural production and human health. *Extr. Ind. Soc.* 2, 683–693.
- Human Rights Watch, 2011. A Poisonous Mix: Child Labor, Mercury, and Artisanal Gold Mining in Mali. Human Rights Watch, New York Retrieved from: [https://www.hrw.org/sites/default/files/reports/mali1211\\_forinsertWebUpload\\_0\\_0.pdf](https://www.hrw.org/sites/default/files/reports/mali1211_forinsertWebUpload_0_0.pdf).
- Human Rights Watch, 2012. 'Waiting Here for Death': Forced Displacement and 'Villagization' in Ethiopia's Gambella Region. Human Rights Watch, New York Retrieved from: [https://www.hrw.org/sites/default/files/reports/ethiopia0112webwcover\\_0.pdf](https://www.hrw.org/sites/default/files/reports/ethiopia0112webwcover_0.pdf).
- Human Rights Watch, 2013. Toxic Toil: Child Labor and Mercury Exposure in Tanzania's Small-Scale Gold Mines. Human Rights Watch, New York Retrieved from: [https://www.hrw.org/sites/default/files/reports/tanzania0813\\_ForUpload\\_0.pdf](https://www.hrw.org/sites/default/files/reports/tanzania0813_ForUpload_0.pdf).
- Human Rights Watch Precious Metal, Cheap Labor: child Labor and Corporate Responsibility in Ghana's Artisanal Gold Mines 2015 Human Rights Watch New York. (Retrieved from: Ghana) [https://www.hrw.org/sites/default/files/report\\_pdf/ghana0515\\_forinsertlr2\\_0.pdf](https://www.hrw.org/sites/default/files/report_pdf/ghana0515_forinsertlr2_0.pdf).
- S. Imai The 'Canada Brand': Violence and Canadian Mining Companies in Latin America (Justice and Corporate Accountability Project, 2016), Legal Studies Research Paper Series No. 17 2017 Retrieved from: <https://ssrn.com/abstract=2886584>.
- International Consortium of Investigative Journalists, 2015. Evicted and Abandoned: The World Bank's Broken Promise to the Poor. International Consortium of Investigative Journalists (On-line). Retrieved from: <https://www.icij.org/project/world-bank>.
- International Consortium of Investigative Journalists, 2017a. Paradise papers: secrets of the Global Elite. ICIJ (On-line) Retrieved from: <https://www.icij.org/investigations/paradise-papers/>.
- International Consortium of Investigative Journalists, 2017b. The Panama Papers: politicians, criminals and the Rogue industry that hides their cash. ICIJ (On-line) Retrieved from: <https://panamapapers.icij.org>.
- International Labour Organization, 2017. Mining (coal; other mining) sector. ILO (On-line) Retrieved from: <http://www.ilo.org/global/industries-and-sectors/mining/lang-en/index.htm>.
- Ite, A.E., Ibok, U.J., 2013. Gas flaring and venting associated with petroleum exploration and production in the Nigeria's Niger Delta. *Am. J. Environ. Prot.* 1, 70–77.
- Jonah, F.E., Adjei-Boateng, D., Agbo, N.W., Mensah, E.A., Edziye, R.E., 2015. Assessment of sand and stone mining along the coastline of Cape Coast, Ghana. *Ann. GIS* 21, 223–231.
- Karl, T.L., 1999. The Perils of the Petro-state: reflections on the paradox of plenty. *J. Int. Aff.* 53, 31–48.
- Kelly, M.P., Doohan, E., 2012. The social determinants of health. In: Merson, M.H., Black, R.E., Mills, A.J. (Eds.), *Global Health: Diseases, Programs, Systems, and Policies*, 3rd ed. Jones & Bartlett Learning, Burlington, MA, pp. 75–114.
- Kelly, M.P., Kelly, R.S., Russo, F., 2014. The integration of social, behavioral, and biological mechanisms in models of pathogenesis. *Perspect. Biol. Med.* 57, 308–328.
- Kim, T., Grigalunas, T., 2009. Simulating direct and indirect damages to commercial fisheries from marine sand mining: a case study in Korea. *Environ. Manag. (N.Y.)* 44, 566–578.
- Kirsch, S., 2014. Mining Capitalism: the Relationship between Corporations and their Critics. University of California Press, Oakland.
- Kneen, J., 2009. Mining in the Democratic Republic of Congo. Miningwatch Canada (On-line). Retrieved from: <https://miningwatch.ca/blog/2009/5/6/mining-democratic-republic-congo>.
- Kolstad, I., Søreide, T., 2009. Corruption in natural resource management: implications for policy makers. *Resour. Policy* 34, 214–226.
- Krieger, N., 2011. *Epidemiology and the People's Health: Theory and Context*. Oxford University Press, Oxford.
- Kröger, M., Lalander, R., 2016. Ethno-territorial rights and the resource extraction boom in Latin America: do constitutions matter? *Third World Q.* 37, 682–702.
- Land Deal Politics Initiative, 2012. Information about the LDPI. Institute for Poverty, Land and Agrarian Studies, University of the Western Cape (On-line). Retrieved from: <http://www.plaas.org.za/ldpi/info>.
- Land Matrix, 2017. The online public database on land deals. (On-line). Retrieved from: <http://landmatrix.org/en/>.
- Le Billon, P., 2005. Aid in the Midst of Plenty: Oil Wealth, Misery and Advocacy in Angola. *Disasters* 29, 1–25.
- Le Billon, P., 2011. Extractive sectors and illicit financial flows: What role for revenue governance initiatives? *U4 Issue* 13. Bergen: Chr. Michelsen Institute. Retrieved from: <http://hdl.handle.net/11250/2474929>.
- Le Billon, P., 2013. Wars of Plunder: Conflicts, Profits and the Politics of Resources. Oxford University Press, Oxford.
- Le Billon, P., Nicholls, E., 2007. Ending 'resource wars': revenue sharing, economic sanction or military intervention? *Int. Peace.* 14, 613–632.
- Le Billon, P., Somerville, M., 2017. Landing capital and assembling 'investable land' in the extractive and agricultural sectors. *Geoforum* 82, 212–224.
- Levin, M., 2013. Regimes of dispossession: from steel towns to special economic zones. *Dev. Change* 44, 381–407.
- Loayza, N., Rigolini, J., 2016. The local impact of mining on poverty and inequality: evidence from the commodity boom in Peru. *World Dev.* 84, 219–234.
- London, L., Kisting, S., 2016. The extractive industries: can we find new solutions to seemingly intractable problems? *New Solut.* 25, 421–430.
- Lyons, J., 2016. (September 27). The Angola Oil Companies Don't Want You to See. Houston Press. Retrieved from: <http://www.houstonpress.com/news/the-angola-oil-companies-dont-want-you-to-see-8805538>.
- Marchak, P., 1991. The Integrated Circus: the New Right and the Restructuring of Global Markets. McGill-Queen's University Press, Montreal.
- Marrs, T.C., Karalliede, L., 2012. *The Toxicology of Pesticides. Essentials of toxicology for health protection: A handbook for field professionals*, 2nd ed. Oxford University Press, Oxford.
- Marshall, J., 2015. The worst company in the world. *Jacobin*, no. 19. Retrieved from: <https://www.jacobinmag.com/2015/11/vale-corporation-brazil-mining-lula-mozambique-brics>.
- Martínez-Alier, J., Temper, L., Demaria, F., 2014. Social metabolism and environmental conflicts in India. *Indi@logs - Span. J. India Stud.* 1, 51–83.
- Mason, N.M., Jayne, T.S., Chapoto, A., Donovan, C., 2011. Putting the 2007/2008 global food crisis in longer-term perspective: trends in staple food affordability in urban Zambia and Kenya. *Food Policy* 36, 350–367.
- McDonnell, E., 2015. The co-constitution of neoliberalism, extractive industries, and indigeneity: anti-mining protests in Puno, Peru. *Extr. Ind. Soc.* 2, 112–123.
- Middeldorp, N., Morales, C., van der Haar, G., 2016. Social mobilisation and violence at the mining frontier: the case of Honduras. *Extr. Ind. Soc.* 3, 930–938.
- MiningWatch Canada, 2017a. Barrick Gold. Miningwatch Canada [On-line]. Retrieved from: <https://miningwatch.ca/categories/company-country-issue/company/barrick-gold>.
- MiningWatch Canada, 2017b. Salvadoran legislature votes for water over gold, becoming first nation to ban metals mining worldwide. MiningWatch Canada [On-line]. Retrieved from: <http://miningwatch.ca/blog/2017/3/6/latin-american-organizations-denounce-deadly-impacts-mining-during-pdac-2017>.
- Mohapatra, S., Shaikh, A., Nayak, P., Navada, R., 2017. Hazards and Health Risks Encountered by Manual Sand Dredgers from Udipi 11. A Cross-sectional Study. *Journal of Clinical & Diagnostic Research, India*, pp. LC11–LC17.
- Moore, J., 2017. Latin American Organizations Denounce the Deadly Impacts of Mining During PDAC 2017. Miningwatch Canada [On-line]. Retrieved from: <https://miningwatch.ca/blog/2017/3/6/latin-american-organizations-denounce-deadly-impacts-mining-during-pdac-2017>.
- Moore, J., Broad, R., Cavanagh, J., Guerra Salazar, R., Karunanathan, M., Morrill, J., et al., 2014. Debunking eight falsehoods by Pacific Rim Mining/Oceanagold in El Salvador. International Allies Against Mining in El Salvador, Ottawa Retrieved from: <http://www.ips-dc.org/wp-content/uploads/2014/03/Eight-Falsehoods-Final-March-17-2014-WEB.pdf>.
- Morrice, E., Colagiuri, R., 2013. Coal mining, social justice and health: a universal conflict of power and priorities. *Health Place* 19, 74–79.
- Munarriz, G., 2008. Rhetoric and reality: the World Bank Development policies, mining corporations, and indigenous communities in Latin America. *Int. Community Law Rev.* 10, 431–443.



- Natural Resources Canada, 2018. Canadian Mining Assets. Information Bulletin. pp. 2018. Retrieved from: <http://www.nrcan.gc.ca/mining-materials/publications/19323>.
- Ndikumana, L., Boyce, J., 2011. Africa's Odiious Debts: How Foreign Loans and Capital Flight Bled a Continent. Zed Books, London.
- Neto, E.N., Lacaz, F., Pignati, W.A., 2014. Health surveillance and agribusiness: the impact of pesticides on health and the environment. *Danger ahead!*. *Ciência Saúde Coletiva* 19, 4709–4718.
- Ngugi, F., 2017. What Makes Luanda Most Expensive City in the World? Face2Face Africa (On-line). Retrieved from: <https://face2faceafrica.com/article/luanda-expensive-2>.
- Nkurunziza, J.D., 2015. Capital flight and poverty reduction in Africa. In: Ajayi, S.I., Ndikumana, L. (Eds.), *Capital Flight from Africa: Causes, Effects, and Policy Issues*. Oxford University Press, Oxford, pp. 81–110.
- Nolte, K., Chamberlain, W., Giger, M., 2016. International Land Deals for Agriculture: Fresh Insights from the Land Matrix: Analytical Report II. Centre for Development and Environment, University of Bern, Bern. [http://www.landmatrix.org/media/filer\\_public/ab/c8/abc8b563-9d74-4a47-9548-cb59e4809b4e/land\\_matrix\\_2016\\_analytical\\_report\\_draft\\_ii.pdf](http://www.landmatrix.org/media/filer_public/ab/c8/abc8b563-9d74-4a47-9548-cb59e4809b4e/land_matrix_2016_analytical_report_draft_ii.pdf).
- North, L.L., Grinspun, R., 2016. Neo-extractivism and the new Latin American developmentalism: the missing piece of rural transformation. *Third World Q.* 37, 1483–1504.
- Observatorio de Conflictos Mineros de América Latina, 2017. Conflictos mineros en América Latina: Extracción, saqueo y agresión-Estado de situación en 2016. Santiago: Observatorio de Conflictos Mineros de América Latina. Retrieved from: <https://www.ocmal.org/wp-content/uploads/2017/06/Estado-Situacion-Conflictos-Mineros-en-2016.pdf>.
- Onishi, N., 2017. Angola's Corrupt Building Boom: 'Like Opening a Window and Throwing Out Money'. *New York Times*. Retrieved from: <https://www.nytimes.com/2017/06/24/world/africa/angola-luanda-jose-eduardo-dos-santos.html>, (June 24).
- Orji, U.J., 2014. Moving from gas flaring to gas conservation and utilisation in Nigeria: a review of the legal and policy regime. *OPEC Energy Rev.* 38, 149–183.
- Ortiz, I., Chai, J., Cummins, M. (2011). *Escalating Food Prices: The threat to poor households and policies to safeguard a Recovery for All*, Social and Economic Policy Working Paper. New York: UNICEF. Retrieved from: [http://www.unicef.org/socialpolicy/files/Escalating\\_Food\\_Prices.pdf](http://www.unicef.org/socialpolicy/files/Escalating_Food_Prices.pdf).
- Ottersen, O.P., Dasgupta, J., Blouin, C., Buss, P., Chongsuvivatwong, V., Frenk, J., et al., 2014. The political origins of health inequity: prospects for change. *Lancet* 383, 630–667.
- Padmalal, D., Maya, K., 2014. *Sand Mining: Environmental Impacts and Selected Case Studies*. Springer, New York.
- Page, M.T., 2016. Improving U.S. Anticorruption Policy in Nigeria, Corruption Brief. Washington, DC: Council on Foreign Relations. Retrieved from: [http://i.cfr.org/content/publications/attachments/CorruptionBrief\\_Page\\_Nigeria\\_OR.pdf](http://i.cfr.org/content/publications/attachments/CorruptionBrief_Page_Nigeria_OR.pdf).
- Panel of Experts, 2003. on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of the Congo. Final Report to the Secretary-General. United Nations, New York Retrieved from: <https://miningwatch.ca/sites/default/files/N0356736.pdf>.
- Paredes, M., 2016. The glocalization of mining conflict: cases from Peru. *Extr. Ind. Soc.* 3, 1046–1057.
- Patel, R., 2009. Food sovereignty. *J. Peasant Stud.* 36, 663–706.
- Pereira, K., Ratnayake, R., 2013. *Water Integrity in Action: Curbing Illegal Sand Mining in Sri Lanka*. Network. Water Integrity, Berlin.
- Prain, G., 2010. Effects of the Global Financial Crisis on the Food Security of Poor Urban Households: Synthesis Report On Five City Case Studies. Resource Centres on Urban Agriculture and Food Security Foundation, Leusden Retrieved from: <http://www.ruaf.org/sites/default/files/Synthesis%20report%20final.pdf>.
- Pricewaterhouse Coopers, 2016. The Choice to Change: Africa oil & gas review. PwC in South Africa. Retrieved from: <https://www.pwc.co.za/en/assets/pdf/africa-oil-and-gas-review-2016.pdf>.
- Quinn, H., 2015. Advanced military technology shows need for minerals and metals supply. The Hill (On-line). Retrieved from: <http://thehill.com/blogs/pundits-blog/defense/238041-advanced-military-technology-shows-need-for-minerals-and-metals>.
- Ramírez-Cendrero, J.M., Wirth, E., 2016. Is the Norwegian model exportable to combat Dutch disease? *Resour. Policy* 48, 85–96.
- Redvers, L., 2012. (September 28). Oil-rich Cabinda the poorer for it. *Mail & Guardian*. Retrieved from: <https://mg.co.za/article/2012-09-28-00-oil-rich-cabinda-the-poorer-for-it>.
- Reed, K., 2009. *Crude Existence: Environment and the Politics of Oil in Northern Angola*. University of California Press, Berkeley.
- Rege, A., 2016. Not biting the dust: using a tripartite model of organized crime to examine India's Sand Mafia. *Int. J. Comp. Appl. Crim. Justice* 40, 101–121.
- Ridde, V., Campbell, B., Martel, A., 2015. Mining revenue and access to health care in Africa: could the revenue drawn from well-managed mining sectors finance exemption from payment for health? *Dev. Pract.* 25, 909–918.
- Robinson, W.I., 2002. Remapping development in light of globalisation: from a territorial to a social cartography. *Third World Q.* 23, 1047–1071.
- C. Roche, K. Thygesen, E. Baker, Mine Tailings Storage: Safety Is No Accident. 2017 United Nations Environment Programme Nairobi. Retrieved from: [https://gridareland-website.s3.amazonaws.com/production/documents/s\\_document/371/original/RRR\\_MineTailings\\_lores.pdf?1510660693](https://gridareland-website.s3.amazonaws.com/production/documents/s_document/371/original/RRR_MineTailings_lores.pdf?1510660693).
- Rochlin, J., 2015. Boom, bust and human security in the extractive sector: the case of Colombia. *Extr. Ind. Soc.* 2, 734–745.
- M.I. Rodríguez Lo Biológico y lo Social: Su Articulación en la Formación del Personal de Salud. 1994 Pan-Americah Health Organization Washington, DC. Retrieved from: <http://iris.paho.org/xmlui/bitstream/handle/123456789/3095/Lo%20biologico%20y%20lo%20social.pdf?sequence=1>.
- Ross, M.L., 2015. What have we learned about the resource curse? *Annu. Rev. Political Sci.* 18, 239–259.
- Rubenstein, M., 2012. Emissions from the Cement Industry. [On-line]. Retrieved from: <http://blogs.ei.columbia.edu/2012/05/09/emissions-from-the-cement-industry/>.
- Ruel, M.T., Garrett, J.L., Hawkes, C., Cohen, M.J., 2010. The food, fuel, and financial crises affect the urban and rural poor disproportionately: a review of the evidence. *J. Nutr.* 140, 170S–176S.
- Rulli, M.C., D'Odorico, P., 2014. Food appropriation through large scale land acquisitions. *Environ. Res. Lett.* 9, 064030.
- Rulli, M.C., Savioli, A., D'Odorico, P., 2013. Global land and water grabbing. *Proc. Natl. Acad. Sci. USA* 110, 892–897.
- Salazar-Camacho, C., Salas-Moreno, M., Marrugo-Madrid, S., Marrugo-Negrete, J., Díez, S., 2017. Dietary human exposure to mercury in two artisanal small-scale gold mining communities of northwestern Colombia. *Environ. Int.* 107, 47–54.
- Sassen, S., 2014. *Expulsions: Brutality and Complexity in the Global Economy*. Belknap Press, Cambridge.
- Schuppert, F., 2014. Beyond the national resource privilege: towards an International Court of the Environment. *Int. Theory* 6, 68–97.
- Shaxson, N., 2007. Oil, corruption and the resource curse. *Int. Aff.* 83, 1123–1140.
- Siegle, J., 2009. Governance strategies to remedy the natural resource curse. *Int. Social. Sci. J.* 57 (s1), 45–55.
- Soares de Oliveira, R., 2007. *Oil and Politics in the Gulf of Guinea*. Columbia University Press, New York.
- Sowunmi, F.A., Hogarh, J.N., Agbola, P.O., Atewamba, C., 2016. Sand dredging and environmental efficiency of artisanal fishermen in Lagos state, Nigeria. *Environ. Monit. Assess. (Dordr.)* 188, 1–19.
- Specter, M., 2015. (June 1). Extreme City: The severe inequality of the Angolan oil boom. *New Yorker*. Retrieved from: <http://www.newyorker.com/magazine/2015/06/01/extreme-city-specter>.
- Spring, K., 2016. Mining in a State of Impunity: Coerced Negotiations and Forced Displacement by Aura Minerals in Western Honduras. Honduras Solidarity Network and MiningWatch Canada, Ottawa.
- Sreebha, S., Padmalal, D., 2011. Environmental impact assessment of sand mining from the small catchment rivers in the southwestern coast of India: a case study. *Environ. Manag.* 47, 130–140.
- Srikantia, J., 2016. The structural violence of globalization. *Crit. Perspect. Int. Bus.* 12, 222–258.
- Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O., Ludwig, C., 2015. The trajectory of the Anthropocene: the Great Acceleration. *Anthr. Rev.* 2, 81–98.
- Stockhammer, E., 2012. Financialization, income distribution and the crisis. *Investig. Económica* 71, 39–70.
- Studnicki-Gizbert, D., 2016. Canadian mining in Latin America (1990 to present): a provisional history. *Can. J. Lat. Am. Caribb. Stud.* 41, 95–113.
- Szablowski, D., 2007. *Transnational Law and Local Struggles: Mining, Communities and the World Bank*. Hart Publishing, Oxford.
- Tamea, S., Allamano, P., Carr, J.A., Claps, P., Laio, F., Ridolfi, L., 2013. Local and global perspectives on the virtual water trade. *Hydrol. Earth Syst. Sci.* 17, 1205–1215.
- TMX Newswire, 2018. TMX Group Welcomes International Mining Community to PDAC 2018. Retrieved from: <https://www.tmx.com/newsroom?ld=643>.
- Toronto Stock Exchange, 2017. Mining. TSX [On-line]. Retrieved from: <https://www.tsx.com/listings/listing-with-us/sector-and-product-profiles/mining>.
- U.N. Comtrade Analytics, 2016. UN Comtrade database (commodity profile: stone, sand and gravel 273). Retrieved from: <https://comtrade.un.org/labs/data-explorer/>.
- UNICEF, 2015. Situation Analysis: Children and Women in Angola. UNICEF Angola, Luanda Retrieved from: [https://www.unicef.org/videoaudio/PDFs/Situations\\_Analysis\\_Angola\\_EN\\_low-res.pdf](https://www.unicef.org/videoaudio/PDFs/Situations_Analysis_Angola_EN_low-res.pdf).
- Union of Concerned Scientists, 2015. All About Oil. Union of Concerned Scientists (On-line). Retrieved from: [http://www.ucsusa.org/clean-vehicles/all-about-oil/VkECnr\\_YH3A](http://www.ucsusa.org/clean-vehicles/all-about-oil/VkECnr_YH3A).
- UNCTAD (United Nations Conference on Trade and Development). World Investment Report 2013: Global Value Chains: Investment and Trade for Development, 2013. United Nations, New York and Geneva.
- UNDP (United Nations Development Programme), 2015. National Human Development Report, 2015: Human Security and Human Development in Nigeria. UNDP. Retrieved from: [http://hdr.undp.org/sites/default/files/2016\\_national\\_human\\_development\\_report\\_for\\_nigeria.pdf](http://hdr.undp.org/sites/default/files/2016_national_human_development_report_for_nigeria.pdf).
- UNEP (United Nations Environment Programme), 2011. Environmental assessment of Ogoniland. UNEP, Nairobi Retrieved from: [postconflict.unep.ch/publications/OEA/UNEP\\_OEA.pdf](http://postconflict.unep.ch/publications/OEA/UNEP_OEA.pdf).
- UNEP (United Nations Environment Programme), 2014. Sand, rarer than one thinks UNEP Global Environmental Alert Service. Retrieved from: [http://wedocs.unep.org/bitstream/handle/20.500.11822/8665/GEAS\\_Mar2014\\_Sand\\_Mining.pdf?Sequence=3&isAllowed=y](http://wedocs.unep.org/bitstream/handle/20.500.11822/8665/GEAS_Mar2014_Sand_Mining.pdf?Sequence=3&isAllowed=y).
- Upadhyay, R., Ranjan, G., 2016. Occupational risks in mining: the case of Nepalese migrant workers in the coal mines of Jaintia Hills, Meghalaya. *Orient. Anthropol.* 16, 87–98.
- Urkidi, L., 2010. A glocal environmental movement against gold mining: Pascua-Lama in Chile. *Ecol. Econ.* 70, 219–227.
- van Reybrouck, D., 2014. Congo: the Epic History of a People. Harper Collins, New York.
- Veltmeyer, H., 2013. The political economy of natural resource extraction: a new model or extractive imperialism? *Can. J. Dev. Stud./Rev. Can. Rev. Can. Etudes Dev.* 34 (1), 79–95.
- Villalba, U., 2013. Buen Vivir vs Development: a paradigm shift in the Andes? *Third World Q.* 34, 1427–1442.



- Wallis, W., 2014. Nigeria's super elite laps up luxury as 60% live in severe poverty. *Financial Times* (On-line). Retrieved from: <<http://www.ft.com/cms/s/0/54a6d688-bb14-11e3-948c-00144feabdc0.html#axzz3L1QwcUwU>>.
- Walter, M., Urkidi, L., 2017. Community mining consultations in Latin America (2002–2012): the contested emergence of a hybrid institution for participation. *Geoforum* 84, 265–279.
- Walvin, J., 2015. *Crossings: africa, the Americas, and the Atlantic Slave Trade*. Reaktion Books, London.
- Watts, J., 2018 (2 February). Almost four environmental defenders a week killed in 2017. *Guardian*. Retrieved from: <[https://www.theguardian.com/environment/2018/feb/02/almost-four-environmental-defenders-a-week-killed-in-2017?CMP=share\\_btn\\_tw](https://www.theguardian.com/environment/2018/feb/02/almost-four-environmental-defenders-a-week-killed-in-2017?CMP=share_btn_tw)>.
- Watts, J., Vidal, J., 2017 (July 13). Environmental defenders being killed in record numbers globally, new research reveals. *Guardian*. Retrieved from: <<https://www.theguardian.com/environment/2017/jul/13/environmental-defenders-being-killed-in-record-numbers-globally-new-research-reveals>>.
- Welland, M., 2009. *Sand: the Never-ending Story*. University of California Press, Berkeley; Los Angeles.
- Wenar, L., 2008. Property rights and the resource curse. *Philos. Public Aff.* 38 (no. 1), 2–32.
- White, B., Borras, S., Hall, R., Scoones, I., Wolford, W., 2012. The new enclosures: critical perspectives on corporate land deals. *J. Peasant Stud.* 39, 619–647.
- Whitehead, M., Pennington, A., Orton, L., Nayak, S., Petticrew, M., Sowden, A., et al., 2016. How could differences in 'control over destiny' lead to socio-economic inequalities in health? A synthesis of theories and pathways in the living environment. *Health Place* 39, 51–61.
- Williams, D., Le Billion, P., 2017. (Eds.). *Corruption, Natural Resources and Development: From Resource Curse to Political Ecology*. Edward Elgar, Cheltenham.
- Wood, E.M., 1999. The politics of capitalism. *Mon. Rev.*, 51 no. 4, 12–26.
- WHO (World Health Organization), 2016. Angola grapples with worst yellow fever outbreak in 30 years. World Health Organization (On-line). Retrieved from: <<http://www.who.int/features/2016/angola-worst-yellow-fever/en/>>.
- Working Group on Mining and Human Rights in Latin America, 2014. The impact of Canadian mining in Latin America and Canada's responsibility: Executive summary of the report submitted for publication to the Inter-American Commission on Human Rights. Observatorio Latinoamericano de Conflictos Ambientales, Colectivo de Abogados José Alvear Restrepo, Due Process of Law Foundation, Centro Hondureño de Promoción para el Desarrollo Comunitario, Asamblea Nacional de Afectados Ambientales, and Asociación Marianista de Acción Social y Red Muqui. Retrieved from: <[http://www.dplf.org/sites/default/files/report\\_canadian\\_mining\\_executive\\_summary.pdf](http://www.dplf.org/sites/default/files/report_canadian_mining_executive_summary.pdf)>.
- World Bank, 1992. *Strategy for African Mining*, World Bank Technical Paper No. 181. Washington, D.C.: World Bank. Retrieved from: <<http://documents.worldbank.org/curated/en/722101468204567891/Strategy-for-African-mining>>.
- World Bank, 2017. *The World Bank Group in Extractive Industries: 2016 Annual Review*. World Bank Group, Washington, DC Retrieved from: <<http://documents.worldbank.org/curated/en/308251487843614875/pdf/112709-AR-WBG-in-Extractive-Industries-Annual-Review-2016-PUBLIC.pdf>>.
- World Water Assessment Programme, 2017. *Wastewater: the Untapped Resource - United Nations World Water Development Report 2017*. UNESCO, Paris Retrieved from: <<http://unesdoc.unesco.org/images/0024/002471/247153e.pdf>>.
- Xiao, R., Wang, S., Li, R., Wang, J.J., Zhang, Z., 2017. Soil heavy metal contamination and health risks associated with artisanal gold mining in Tongguan, Shaanxi, China. *Ecotoxicol. Environ. Saf.* 141, 17–24.
- Yakubu, O.H., 2017. Addressing environmental health problems in Ogoniland through Implementation of United Nations environment program recommendations: environmental management strategies. *Environments* 4, 28. <http://dx.doi.org/10.3390/environments4020028>.
- Zucman, G., 2014. Taxing across Borders: tracking personal wealth and corporate profits. *J. Econ. Perspect.* 28, 121–148.